

# PATENT ABSTRACTS OF JAPAN

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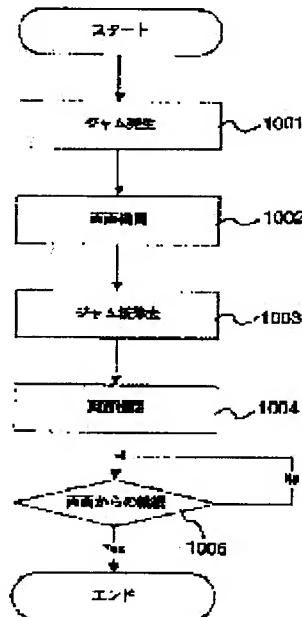
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## (54) IMAGE FORMING SYSTEM

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To facilitate recovering in the case of performing the reprint operation after removing a jam when the jam occurs irrespective of the both side device at the time of both side passing paper.

**SOLUTION:** This system is provided with the both side device attached on outside the digital copying machine main body transporting in reversing a paper sheet to image forming means side, means stopping the one or plural paper sheets in the both side, and a system controller performing control for making the paper sheet in the both side device as effective, when opening/closing the both side device in a state of stopping the paper sheet in both side mechanism. This system controller is, when the jam occurs (1001), to open the both side device (1002), and to remove the jammed paper (1003). The system controller is, to close the main body door on completion of removing the jamming paper, to close the both side device (1004), and to complete, after waiting the paper feed from the both side device (1005), and the controller finally completes the pressing.



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## CLAIMS

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[Claim(s)]

[Claim 1]An image forming system comprising provided with a double-sided machine which is made to reverse a paper and is conveyed to the image forming means side:

A means to make said double-sided inside of a plane suspend a paper of at least one sheet.

A means which controls by validating a paper of the double-sided inside of a plane when the double-sided machine concerned is opened and closed, where a paper is stopped in a double-sided mechanism.

[Claim 2]The image forming system according to claim 1 when a means to perform said control is detected [ that a paper of the double-sided inside of a plane was removed in the state where said double-sided machine was wide opened to a case ], wherein it repeats a paper of the double-sided inside of a plane.

[Claim 3]The image forming system according to claim 2, wherein detection of a paper having been removed is performed by a sensor used for paper conveyance.

[Claim 4]The image forming system according to claim 1 or 2, wherein said double-sided machine is attached to an outside surface of an image forming device body, enabling free attachment and detachment.

[Claim 5]It is an image forming system given in any 1 paragraph of claims 1 thru/or 4 in which expansion is possible by connecting various applications.

[Claim 6]The image forming system according to claim 5, wherein said expansion contains at least one of a copy function, a facsimile function, and the printer functions.

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**DETAILED DESCRIPTION****[Detailed Description of the Invention]****[0001]**

[Field of the Invention]This invention relates to image forming systems, such as a digital copier which are provided with a double-sided machine and forms a picture according to the inputted image data, For example, it has two or more application functions, such as a copy function, a facsimile function, and a printer function, and is related with a suitable image forming system to form a picture according to application.

**[0002]**

[Description of the Prior Art]What adopted the vertical carrier system which conveys a paper from a paper feed tray toward a top to the delivery tray in the upper part, for example is known for the digital copier which has a function corresponding to two or more applications. That to which the double-sided machine which has what is called a double-sided mechanism in which the outside of the main part which carries out vertical conveyance is made to reverse a paper further is attached is also known for the thing of such a vertical carrier system.

**[0003]**

[Problem(s) to be Solved by the Invention]When removing the paper jam produced within the copier body, it is necessary to open end \*\*\*\*\* and a main part door for the double-sided machine itself, and to remove a jammed paper in such a digital copier. Since the paper was treated as jam when the double-sided machine opened, even if there is also a problem of conveyance and the paper existed in the double-sided inside of a plane then, it had resulted in making useless the paper which has not carried out jam.

[0004]This invention is made in view of the problem of such conventional technology, it is a thing and the purpose is in improving the productivity in the case of performing re printing operation after jam removal when generated by the jam without regards to a double-sided machine at the time of double-sided passage of sheets.

[0005]Other purposes are to enable it to recognize the paper information of the double-sided inside of a plane certainly at the same time they raise the productivity in the case of performing re printing operation after jam removal when it is generated in the image forming system of the same gestalt by the jam without regards to a double-sided machine at the time of double-sided passage of sheets.

**[0006]**

[Means for Solving the Problem]This invention is provided with the following in order to attain said purpose. A means to make the double-sided inside of a plane suspend a paper of one sheet thru/or two or more sheets in an image forming system provided with a double-sided machine which is made to reverse a paper and is conveyed to the image forming means side.

A means which controls by validating a paper of the double-sided inside of a plane when the double-sided machine concerned is opened and closed, where a paper is stopped in a double-sided mechanism.

[0007]In this case, a means to perform said control repeats a paper of the double-sided inside of a plane, when it is detected that a paper of the double-sided inside of a plane was removed in the state where said double-sided machine was wide opened to a case. About detection of a paper having been removed, it is good for a sensor used for paper conveyance to be made to perform. Said double-sided machine is attached to an outside surface of an image forming device body, enabling free attachment and detachment.

[0008]The image forming system of this means can plan expansion by connecting various applications, and at least one of a copy function, a facsimile function, and the printer functions is contained in expansion by said various applications.

**[0009]**

[Embodiment of the Invention]Hereafter, the 1 embodiment of this invention is described with reference to drawings.

[0010]Drawing 1 is a perspective view showing the appearance of the digital copier as an image forming system

which has two or more application functions concerning the embodiment of this invention. This digital copier 100 the image forming device 110, the sheet feeding device 120 which is in the lower part of the image forming device 110, and was provided with the multi stage feeding part, the image reader 130 which is in the upper part of the image formation part 110, and reads the picture of a manuscript etc., and the paper with which the picture was formed in one side. It comprises the double-sided machine 140 which makes it reversed, sends into the image forming device 110, and makes a picture form in both sides, and the manuscript allowance device 150 which sends a manuscript into the image reader 130 automatically, and makes it read it. The final controlling element 200 as shown also in drawing 2 is formed in the upper surface of the image forming device 110, and an operator can input various directions now to the sheet feeding device 120, the image reader 130, the double-sided machine 140, and the manuscript allowance device 150 which were connected to the image forming device 110.

[0011]Program registration / call key 201, the interruption key 202, and the application change key 206 are allotted to the right-hand side upper part so that drawing 2 may show the final controlling element 200, the lower part of program registration / call key 201 -- the ten key 205 -- the initial-setting key 203 allots the abbreviated key group 204 for FAX to the left-hand side upper part, it is allotted to the lower part, LED group 207 is allotted to the upper part, respectively, and final controlling element LCD208 is further provided in the center section.

[0012]Program registration / call key 201 is used for registration and a call of a program mode. The initial-setting key 203 is used when performing initial setting. The key to [01] - [28] of the abbreviated key group 204 for FAX is used for assignment of the program of a facsimile mode. Setting out of versatility [ ten key / 205 / key / between [0] - [9] ] is performed, and also it is used for assignment of the program of copy mode. The application change key 206 is a change key to each application of a copy, fax, and a printer, and transfers the right of a final controlling element display to the application equivalent to the pressed key.

[0013]It is a device with the function for the image reader 130 to irradiate a manuscript with a light source, to change the catoptric light into an electrical signal with a solid imaging element (CCD), and to perform required image processing, and since the mechanism itself is publicly known, explanation here is omitted. The image forming device 110 is a device which forms in a regular paper, a thermal paper, etc. the picture images sent with the electrical signal by electro photography, heat sensitivity, hot printing, an ink jet, or other means.

[0014]A picture is changed into an electrical signal, and is read into the big feature of the digital copier 100, and there is a function in which the image forming device 110 restores an electrical signal. It becomes applicable to fields other than a copying machine by having a means to change and to transmit variously the electrical signal read at this time. Application ranges, such as a scanner and a file system, are dramatically wide in addition to the above-mentioned fax and a printer. These expanded function are called "application."

[0015]The signal for taking the electrical signal of the picture changed with the above-mentioned image reader 130, the electrical signal of a picture inputted into the image forming device 110 and the electrical signal of a picture, and a synchronization is collectively expressed as a "video signal." In order to exchange a video signal between the image reader 130, the image forming device 110, and application, it is necessary to transmit information and to suit between devices. This means is expressed as a "control signal" or "command" issue.

[0016]It not only records one application, but in the latest digital copier 100, it has come to carry out the simultaneous registration of two or more applications. Thus, the digital copier which shares one resources is expressed as a "system", and the controller which controls this system is expressed as "system control" and a "system controller." The functional unit unit shared between two or more applications is expressed as "resources" and a "resource." The above-mentioned system controller is performing system control in this resource unit. As resources managed with the digital copier 100 in this case, there are the image reader 130, the image forming device 110, the final controlling element 200, a memory, and peripheral machines (DF= manuscript allowance device, a sorter, etc.) represented by the double-sided machine 140.

[0017]A "plug output" is mainly used by the explanation of operation at the time of a generating picture. Usually, other operations are not performed until a generating picture completes a series of operations (=1 job) which make the purpose the same. For example, in the latest digital copier, the function was compounded and copying machine +FAX, a printer, or the combination beyond it is collected to one set. However, after a duplication function is completed, the most is outputting the functional unit (= job unit) so that it may change to a printer output. On the other hand, it expresses inserting and outputting other job outputs to the output of one job as "interleave." For example, a printer output is realized during the output of a copying machine, without stopping machine operation.

[0018]With "initial setting", according to the often used conditions, change the initialized value of each function or. Setting up the conditions of operation is shown and initial setting includes the "system initialization" which sets up the function of a copier system at large, "copy initial setting" limited to setting out of the function of copy mode, "fax initial setting" limited to setting out of the function of a facsimile mode, etc. "system initialization" --- after key operation and fixed time -- when nothing operates it, there is "setting out of auto

clear time", etc. returned to a state when a power supply is switched on, and, There are "the double-sided copy left, \*\* width", etc. which can set up left binding margin width on the back in "copy initial setting" by "setting out of copy set number-of-sheets restrictions" which changes the maximum of the number of copied sheets which can be set, and a "one side → double-sided" copy. "Fax initial setting" includes "setting out of receipt time printing" which chooses the function to print the received time, "address registration" which registers a partner's often used telephone number, etc.

[0019] Drawing 3 is a block diagram showing the system software composition of the digital copier concerning this embodiment. In order to constitute a multitasking type system, it is necessary to treat a functional unit as a resource and to perform management for two or more applications to share one resource. The system control layer 300 shown in drawing 3 performs this management, in addition the application layer 310 and the device control layer 320 are formed.

[0020] The system control layer 300 is constituted by each controllers 302, 303, 304, and 305 of the peripheral machine of the system control part 301, the final controlling element 200, the image reader 130, the image forming device 110, and double-sided machine 140 grade.

[0021] From logical directions of the command from the system control layer 300, a control signal, etc., the device control layer 320 is performing conversion (input/output control 321) which drives mechanical input and output of a clutch, a sensor, a motor, etc., and is inputted, in order to actually operate a device. The application layer 310, The copy application 311, the printer application 312, the FAX application 313, and two or more applications of other application 314 grades are the layers whose coexistence is attained with the function provided from the system control layer 300 as expanded function.

[0022] Drawing 4 is a block diagram showing the hard structure of the image forming device concerning the embodiment of this invention. In this example, CPU311a, and 312a and 313a are given for every application of the copy application 311, the printer application 312, and the FAX application 313, The system control layer 300 and the device control layer 320 are controlled by one CPU301a. However, each application 311,312,313, the system control layer 300, and the hardware that gives CPU to each resource and transmits the command from the system control controller 301 to each controller 302,303,304,305 to it with a controlling signal line are also considered. On the other hand, keycard apparatus is connected with a main part with the control line 401,402,403, and serial communication is used in this embodiment. Although the final controlling element control bus 410 for controlling the final controlling element 200 is shown in the figure, naturally carrying out by the exchange of a command using the above-mentioned controlling signal line is also considered. Thus, since system hard structure is constituted freely, the composition of drawing 3 is not mere illustration, and this invention is not necessarily limited to this composition.

[0023] In drawing 4, the page memories 311b, 312b, and 313b are formed in each application 311,312,313, respectively. The numerals 420 are image formation signal buses.

[0024] As the system control layer 300 shows to drawing 5 in which the relation between the application layer and a system control layer is shown in the digital image formation system of drawing 1, when it sees from the application layer 310, The function in which a virtual resource exists according to all the 311,312,313 applications is provided. It is not necessary to manage a system state and this function enables it to manage all the applications 311,312,313 on the same conditions in the system control layer 300 especially at the application layer 310. That is, the application 311,312,313 sends a using request to the system control layer 300, when a resource to use occurs. In the system control layer 300, a result is sent to request source application, judging from the resource operating condition in the time. In request source application, the right or wrong which can be performed are judged by a result, and if possible, it will perform. Fundamentally, execution right management is performed in an equivalent procedure.

[0025] In the system of drawing 3, there is a resource at a time only in one. For this reason, in the system control layer 300, when the virtual resource using request for every application 311,312,313 competes, in order to pass a actual resource royalty, it is necessary to perform exclusive control or a time sharing assignment. Whether a time sharing assignment is performed changes [ exclusive control or ] with the kind of resource, and user sets. The resource surrounded with the dashed line is a virtual resource, it is in the state where the right of execution (it displays in the case of a final controlling element) is not taken, and the resource surrounded as the solid line shows the state where the execution right was taken.

[0026] Drawing 6 is an explanatory view showing the interleave operation of the copy application 311 and the printer application 312. here -- the copy application 311 -- the "final controlling element" resource 200, the "image forming device" resource 110, and the "image reader" resource 130 -- it is under execution by taking all the execution right. If it is set to the enabled interleave mode by the user set when only the using request of the "image forming device" resource 110 comes from the printer application 312 at this time, the system control layer 300 will carry out time sharing assignment control of the "image forming device" resource 110. Time

sharing assignment control changes the execution right of a resource dynamically among two or more applications. A copy application output and a printer application output are intermingled, and the output from this result "image forming device" resource 110 is outputted. Both waiting time can be suppressed by making a change possible to the minimum, without stopping the resource 110 during this period "an image forming device."

[0027] Drawing 7 is an explanatory view showing the parallel operation of the FAX application 313 and the printer application 312. Here, the fax application 313 has a right of a display of the final controlling element 200, and shows the parallel operation of the print operation of the printer application 312 and the FAX application 313. The FAX application 313 is a transmitting mode of a facsimile, etc., In the case where only the "final controlling element" resource 200 and the "image reader" resource 130 are used, the printer application 312 is when only the "image forming device" resources 110, such as a printer output, are required. Since competition of a resource does not occur in this state even if the FAX application 313 and the printer application 312 carry out a resource demand simultaneously, it is possible exclusion or for it not to be necessary to carry out time sharing allotment, and to accept the demand of both the applications 312,313. Therefore, operation of the printer application 312 and the FAX application 313 can completely be performed simultaneously.

[0028] Drawing 8 is a model figure showing the internal structure of the digital copier 100 of drawing 1. The manuscript allowance device 150, the image reader 130, the image forming device 110, and the sheet feeding device 120 are arranged from on the digital copier 100, respectively, and the double-sided machine 140 is attached to the body part side of the image forming device 110.

[0029] The pickup roller which the manuscript which the manuscript mounting base 151 was formed in the manuscript allowance device 150, and was placed on this manuscript mounting base 151 drives with the drive motor 152 and which is not illustrated, With a transportation roller and a transportation belt, it is sent in on the contact glass formed in the topmost part of the image reader 130, and paper is delivered after reading.

[0030] By the light source for lighting carried in the 1st running body and the 2nd running body which are not illustrated, and a mirror group, the image reader 130 leads the catoptric light from a manuscript to CCD, reads a manuscript, and drives [ publicly known ] said running body to a vertical scanning direction with the scanner drive motor 131.

[0031] The image forming device 110 leads the laser beam modulated with the laser diode (LD) unit 111 based on the image data read by said CCD to the polygon mirror 113, Irradiate the photo conductor 114 electrified by the electrifying charger with the catoptric light from said polygon mirror 113 rotated with the polygon motor 112 at high speed, and an electrostatic latent image is formed, It is a thing of a publicly known structure to which paper is delivered after developing negatives with the development counter 116, transferring to a transfer medium (transfer paper) by the transfer section 117 and being established in the fixing part 118 with the toner to which this latent image is supplied from the toner bottle 115. The numerals 119 are the photosensor (P sensor) for detecting the concentration of the picture transferred.

[0032] Here the sheet feeding device 120 Two steps of feeding parts 121, and the manual feeding part 122, Feed Collo 123 and conveyance Collo 124 which take out a paper from these feeding parts 121,122, and are conveyed along the longitudinal conveying path 125, The resist roller 126 for taking the timing of the paper and picture which are conveyed, It mainly comprises the branching claw 128 which chooses delivery Collo 127 for delivering the paper which finished fixing in the fixing part 118 to the delivery unit 129, the course which leads the transfer paper with which the picture was formed in the whole surface to the double-sided machine 140, or course delivered to said delivery unit.

[0033] The reversal roller 142 with which the double-sided machine 140 reverses the paper as which the inverting path 141 by the side of a double-sided machine was chosen by the branching claw 128, It has the reversal nail 144 which sends a paper into the double-sided course 143 for leading again the paper reversed by this reversal roller 142 to the photo conductor side, the double-sided transportation roller 145 which sends a paper into the transfer section 117, and the double-sided conveyance sensor 146 which detects the paper led to the double-sided course 143. The double-sided course 143 is set up so that the lower end part of an upper bed part may correspond with the opening provided in the upstream rather than the resist roller 126 of said longitudinal conveying path 125 in accordance with the opening drawn by the branching claw 128 of the upper bed of said longitudinal conveying path 125.

[0034] In a profile, thus the constituted digital copier 100, in order to double the tip and timing of a picture which were formed in the photo conductor 114 by the resist roller 126 through the resist sensor which paper is fed to a paper and is not illustrated from the specified feeding part 121,122, it halts. On the other hand, by the polygon mirror 113, the laser beam generated with the LD unit 111 can be extended to the width of a picture, forms a latent image on the photo conductor 114, by making a toner adhere to the portion of a latent image with the development counter 116, forms a picture and is sent to the transfer section 117. The tip of the picture on the

photo conductor 114 measures the timing which reaches the transfer section 117, and the paper made to stop in resist roller 126 position is conveyed from 126 copies of resist rollers, A picture is transferred on a paper by the transfer section 117, when passing the fixing part 118, heat and a pressure are established, and paper is delivered to the delivery unit 129.

[0035]The system used by this embodiment is a vertical carrier system which conveys a paper upward to the delivery unit 129 arranged from the feeding part 121,122 in the upper part as indicated also to drawing 8.

Therefore, the paper which escaped from the fixing part 118 is reversed, and the double-sided machine 140 which had a double-sided mechanism out of the main part is used as one means of the double-sided function again sent into the image formation part 110.

[0036]The branching claw 128 is leaned so that it may be conveyed at the double-sided machine 140 side, when changing the carrying path after the fixing part 118 by controlling the branching claw 128 located in the place which escaped from the fixing part 118 in a main part and using a double-sided function, as specifically shown in drawing 8. The paper which entered in the double-sided machine 140 reverses a transportation direction in the reversal roller part 142, and leads a paper to downward one by the change of the reversal nail 144. Furthermore, 145 copies of double-sided transportation rollers halted the paper using the double-sided conveyance sensor 146, paper was again fed to the paper in the main part with the feed start signal on the rear face of double-sided, and the double-sided function which sends into the transfer section 117 from the resist roller 126, and prints a rear face is realized.

[0037]When using such a double-sided machine 140 and a paper jam arises, as shown in drawing 9, the paper in the double-sided machine 140 opens double-sided machine 140 the very thing, and performs them from inside. The paper left behind in the main part once opens double-sided machine 140 main parts, and opens and removes the main part door 160 which is in it further.

[0038]By the way, when this kind of double-sided machine 140 is used, it is inefficient, if the double-sided copy is redone whenever it is generated by jam. Then, since it has the mechanism which can suspend a paper within the double-sided machine 140 when using such a double-sided machine 140, double-sided transportation roller 145 position is made to suspend the paper conveyed in the double-sided machine 140. therefore -- in after the print job stop by jam -- the paper information in the double-sided machine 140 -- in other words, information with a paper is held as it is to 145 copies of double-sided transportation rollers. When jammed paper removal by a user is performed, like the above-mentioned, opening of the double-sided machine 140 is performed, opening of the main part door 160 is performed further, the remains paper in a main part is removed, the main part door 160 is shut in as reverse a procedure as the point, the double-sided machine 140 is shut, and it becomes release of jam. At this time, by leaving the paper information in the double-sided machine 140 as it is, the paper left behind in the double-sided machine 140 is treated as effective, and performs feeding after paper re feeding and out of the double-sided machine 140. This becomes possible to raise the productivity of the re printing operation after jam release.

[0039]The procedure at this time is shown in the flow chart of drawing 10. In this procedure, if generated by jam (Step 1001), the double-sided machine 140 will be opened wide (Step 1002), and a jammed paper will be removed (Step 1003). feeding from the double-sided machine 140 if removal of a jammed paper is completed, after shutting the main part door 160 and shutting the double-sided machine 140 further (Step 1004) -- waiting and feeding -- completing (Step 1005) -- processing is finished.

[0040]When the double-sided machine 140 is opened and it shuts again, the paper information in the double-sided machine 140 is held, but when it is in the state which the double-sided machine 140 is opening, the state where the paper in the double-sided machine 140 is removed by the user is also considered. So, when this state is detected, it becomes possible to recognize the paper information in the double-sided machine 140 certainly by repealing paper information in the double-sided machine 140. This procedure is shown in the flow chart of drawing 11.

[0041]In this processing, if generated by jam (Step 1101), the double-sided machine 140 will be opened wide (Step 1102), and it will be confirmed whether the paper in the double-sided machine 140 was removed (Step 1103). A jammed paper is removed if not removed (Step 1104). If removal of a jammed paper is completed, after shutting the main part door 160 and shutting the double-sided machine 140 further (Step 1105), processing will be finished if waiting and feeding complete feeding from the double-sided machine 140 (Step 1106). On the other hand, if the paper in the double-sided machine 140 is removed with the check of Step 1103, the paper information in the double-sided machine 140 will be cleared, and processing (Step 1107) will be finished. Whether when open at that time 140, i.e., a double-sided machine, the paper in the double-sided machine 140 was extracted uses the conveyance sensor 146 used for conveyance in the double-sided machine 140. It becomes unnecessary to introduce composition special to detection of the paper existence in the double-sided machine 140 when the double-sided machine 140 is open by carrying out like this.

[0042]Thus, according to the image forming system concerning this embodiment. It not only becomes possible to make it operate simultaneously by controlling expanded function, such as the copy application 311, the printer application 312, and the FAX application 313, by the system control layer 300, but, When the paper by which image formation was carried out to the whole surface into the double-sided machine 140 after the end of jam processing when these functions were performed using the double-sided machine 140 and a paper jam sometimes arose remains, it can become possible to supply the paper, and for it to be alike on the other hand, and to make image formation perform, and the productivity of image formation can be raised. Therefore, these processings are performed by the system controller in the system control layer 300.

[0043]

[Effect of the Invention]As mentioned above, a means to make the double-sided inside of a plane suspend the paper of one sheet thru/or two or more sheets, where a paper is stopped in a double-sided mechanism according to the invention according to claim 1, when the double-sided machine concerned is opened and closed, Since it has the means which controls by validating the paper of the double-sided inside of a plane, the productivity in the case of performing re printing operation after jam removal when generated by the jam without regards to a double-sided machine at the time of double-sided passage of sheets can be raised.

[0044]Since according to the invention according to claim 2 the paper of the double-sided inside of a plane is repealed when it is detected that the paper of the double-sided inside of a plane was removed in the state where the double-sided machine was wide opened to the case, It becomes possible to progress to a next process, without waiting for supply of the paper from a double-sided machine, and while raising the productivity in the case of performing re printing operation after jam removal when it is generated by this by the jam without regards to a double-sided machine at the time of double-sided passage of sheets, the paper information of the double-sided inside of a plane can be recognized certainly.

[0045]According to the invention according to claim 3, since detection of the paper having been removed is performed by the sensor used for paper conveyance, the effect of the invention according to claim 2 can be obtained, without adding special composition.

[0046]Since the double-sided machine is attached to the outside surface of an image forming device body according to the invention according to claim 4, enabling free attachment and detachment, The productivity in the case of falling to the image forming device book outside of the body the productivity accompanying the jam processing at the time of the double-sided passage of sheets in the machinery which has a double-sided machine not only in prevention but in re printing operation can be raised.

[0047]According to the invention given in claims 5 and 6, the productivity in the case of performing re printing operation at the time of realizing expanded function, such as a copy function, a facsimile function, and a printer function, can be raised by connecting various applications.

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**TECHNICAL FIELD**

[Field of the Invention]This invention relates to image forming systems, such as a digital copier which are provided with a double-sided machine and forms a picture according to the inputted image data, For example, it has two or more application functions, such as a copy function, a facsimile function, and a printer function, and is related with a suitable image forming system to form a picture according to application.

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**PRIOR ART**

[Description of the Prior Art]What adopted the vertical carrier system which conveys a paper from a paper feed tray toward a top to the delivery tray in the upper part, for example is known for the digital copier which has a function corresponding to two or more applications. That to which the double-sided machine which has what is called a double-sided mechanism in which the outside of the main part which carries out vertical conveyance is made to reverse a paper further is attached is also known for the thing of such a vertical carrier system.

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**EFFECT OF THE INVENTION**

[Effect of the Invention]As mentioned above, a means to make the double-sided inside of a plane suspend the paper of one sheet thru/or two or more sheets, where a paper is stopped in a double-sided mechanism according to the invention according to claim 1, when the double-sided machine concerned is opened and closed, Since it has the means which controls by validating the paper of the double-sided inside of a plane, the productivity in the case of performing re printing operation after jam removal when generated by the jam without regards to a double-sided machine at the time of double-sided passage of sheets can be raised.

[0044]Since according to the invention according to claim 2 the paper of the double-sided inside of a plane is repealed when it is detected that the paper of the double-sided inside of a plane was removed in the state where the double-sided machine was wide opened to the case, It becomes possible to progress to a next process, without waiting for supply of the paper from a double-sided machine, and while raising the productivity in the case of performing re printing operation after jam removal when it is generated by this by the jam without regards to a double-sided machine at the time of double-sided passage of sheets, the paper information of the double-sided inside of a plane can be recognized certainly.

[0045]According to the invention according to claim 3, since detection of the paper having been removed is performed by the sensor used for paper conveyance, the effect of the invention according to claim 2 can be obtained, without adding special composition.

[0046]Since the double-sided machine is attached to the outside surface of an image forming device body according to the invention according to claim 4, enabling free attachment and detachment, The productivity in the case of falling to the image forming device book outside of the body the productivity accompanying the jam processing at the time of the double-sided passage of sheets in the machinery which has a double-sided machine not only in prevention but in re printing operation can be raised.

[0047]According to the invention given in claims 5 and 6, the productivity in the case of performing re printing operation at the time of realizing expanded function, such as a copy function, a facsimile function, and a printer function, can be raised by connecting various applications.

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[Translation done.]

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**TECHNICAL PROBLEM**

[Problem(s) to be Solved by the Invention]When removing the paper jam produced within the copier body, it is necessary to open end \*\*\*\*\* and a main part door for the double-sided machine itself, and to remove a jammed paper in such a digital copier. Since the paper was treated as jam when the double-sided machine opened, even if there is also a problem of conveyance and the paper existed in the double-sided inside of a plane then, it had resulted in making useless the paper which has not carried out jam.

[0004]This invention is made in view of the problem of such conventional technology, it is a thing and the purpose is in improving the productivity in the case of performing re printing operation after jam removal when generated by the jam without regards to a double-sided machine at the time of double-sided passage of sheets.

[0005]Other purposes are to enable it to recognize the paper information of the double-sided inside of a plane certainly at the same time they raise the productivity in the case of performing re printing operation after jam removal when it is generated in the image forming system of the same gestalt by the jam without regards to a double-sided machine at the time of double-sided passage of sheets.

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**MEANS**

[Means for Solving the Problem] This invention is provided with the following in order to attain said purpose. A means to make the double-sided inside of a plane suspend a paper of one sheet thru/or two or more sheets in an image forming system provided with a double-sided machine which is made to reverse a paper and is conveyed to the image forming means side.

A means which controls by validating a paper of the double-sided inside of a plane when the double-sided machine concerned is opened and closed, where a paper is stopped in a double-sided mechanism.

[0007] In this case, a means to perform said control repeats a paper of the double-sided inside of a plane, when it is detected that a paper of the double-sided inside of a plane was removed in the state where said double-sided machine was wide opened to a case. About detection of a paper having been removed, it is good for a sensor used for paper conveyance to be made to perform. Said double-sided machine is attached to an outside surface of an image forming device body, enabling free attachment and detachment.

[0008] The image forming system of this means can plan expansion by connecting various applications, and at least one of a copy function, a facsimile function, and the printer functions is contained in expansion by said various applications.

[0009]

[Embodiment of the Invention] Hereafter, the 1 embodiment of this invention is described with reference to drawings.

[0010] Drawing 1 is a perspective view showing the appearance of the digital copier as an image forming system which has two or more application functions concerning the embodiment of this invention. This digital copier 100 the image forming device 110, the sheet feeding device 120 which is in the lower part of the image forming device 110, and was provided with the multi stage feeding part, the image reader 130 which is in the upper part of the image formation part 110, and reads the picture of a manuscript etc., and the paper with which the picture was formed in one side. It comprises the double-sided machine 140 which makes it reversed, sends into the image forming device 110, and makes a picture form in both sides, and the manuscript allowance device 150 which sends a manuscript into the image reader 130 automatically, and makes it read it. The final controlling element 200 as shown also in drawing 2 is formed in the upper surface of the image forming device 110, and an operator can input various directions now to the sheet feeding device 120, the image reader 130, the double-sided machine 140, and the manuscript allowance device 150 which were connected to the image forming device 110.

[0011] Program registration / call key 201, the interruption key 202, and the application change key 206 are allotted to the right-hand side upper part so that drawing 2 may show the final controlling element 200, the lower part of program registration / call key 201 -- the ten key 205 -- the initial-setting key 203 allots the abbreviated key group 204 for FAX to the left-hand side upper part, it is allotted to the lower part, LED group 207 is allotted to the upper part, respectively, and final controlling element LCD208 is further provided in the center section.

[0012] Program registration / call key 201 is used for registration and a call of a program mode. The initial-setting key 203 is used when performing initial setting. The key to [01] - [28] of the abbreviated key group 204 for FAX is used for assignment of the program of a facsimile mode. Setting out of versatility [ ten key / 205 / key / between [0] - [9] ] is performed, and also it is used for assignment of the program of copy mode. The application change key 206 is a change key to each application of a copy, fax, and a printer, and transfers the right of a final controlling element display to the application equivalent to the pressed key.

[0013] It is a device with the function for the image reader 130 to irradiate a manuscript with a light source, to change the catoptric light into an electrical signal with a solid imaging element (CCD), and to perform required image processing, and since the mechanism itself is publicly known, explanation here is omitted. The image forming device 110 is a device which forms in a regular paper, a thermal paper, etc. the picture images sent with the electrical signal by electro photography, heat sensitivity, hot printing, an ink jet, or other means.

[0014]A picture is changed into an electrical signal, and is read into the big feature of the digital copier 100, and there is a function in which the image forming device 110 restores an electrical signal. It becomes applicable to fields other than a copying machine by having a means to change and to transmit variously the electrical signal read at this time. Application ranges, such as a scanner and a file system, are dramatically wide in addition to the above-mentioned fax and a printer. These expanded function are called "application."

[0015]The signal for taking the electrical signal of the picture changed with the above-mentioned image reader 130, the electrical signal of a picture inputted into the image forming device 110 and the electrical signal of a picture, and a synchronization is collectively expressed as a "video signal." In order to exchange a video signal between the image reader 130, the image forming device 110, and application, it is necessary to transmit information and to suit between devices. This means is expressed as a "control signal" or "command" issue.

[0016]It not only records one application, but in the latest digital copier 100, it has come to carry out the simultaneous registration of two or more applications. Thus, the digital copier which shares one resources is expressed as a "system", and the controller which controls this system is expressed as "system control" and a "system controller." The functional unit unit shared between two or more applications is expressed as "resources" and a "resource." The above-mentioned system controller is performing system control in this resource unit. As resources managed with the digital copier 100 in this case, there are the image reader 130, the image forming device 110, the final controlling element 200, a memory, and peripheral machines (DF= manuscript allowance device, a sorter, etc.) represented by the double-sided machine 140.

[0017]A "plug output" is mainly used by the explanation of operation at the time of a generating picture. Usually, other operations are not performed until a generating picture completes a series of operations (=1 job) which make the purpose the same. For example, in the latest digital copier, the function was compounded and copying machine +FAX, a printer, or the combination beyond it is collected to one set. However, after a duplication function is completed, the most is outputting the functional unit (=job unit) so that it may change to a printer output. On the other hand, it expresses inserting and outputting other job outputs to the output of one job as "interleave." For example, a printer output is realized during the output of a copying machine, without stopping machine operation.

[0018]With "initial setting", according to the often used conditions, change the initialized value of each function or. Setting up the conditions of operation is shown and initial setting includes the "system initialization" which sets up the function of a copier system at large, "copy initial setting" limited to setting out of the function of copy mode, "fax initial setting" limited to setting out of the function of a facsimile mode, etc. "system initialization" -- after key operation and fixed time -- when nothing operates it, there is "setting out of auto clear time", etc. returned to a state when a power supply is switched on, and, There are "the double-sided copy left, \*\* width", etc. which can set up left binding margin width on the back in "copy initial setting" by "setting out of copy set number-of-sheets restrictions" which changes the maximum of the number of copied sheets which can be set, and a "one side → double-sided" copy. "Fax initial setting" includes "setting out of receipt time printing" which chooses the function to print the received time, "address registration" which registers a partner's often used telephone number, etc.

[0019]Drawing 3 is a block diagram showing the system software composition of the digital copier concerning this embodiment. In order to constitute a multitasking type system, it is necessary to treat a functional unit as a resource and to perform management for two or more applications to share one resource. The system control layer 300 shown in drawing 3 performs this management, in addition the application layer 310 and the device control layer 320 are formed.

[0020]The system control layer 300 is constituted by each controllers 302, 303, 304, and 305 of the peripheral machine of the system control part 301, the final controlling element 200, the image reader 130, the image forming device 110, and double-sided machine 140 grade.

[0021]From logical directions of the command from the system control layer 300, a control signal, etc., the device control layer 320 is performing conversion (input/output control 321) which drives mechanical input and output of a clutch, a sensor, a motor, etc., and is inputted, in order to actually operate a device. The application layer 310, The copy application 311, the printer application 312, the FAX application 313, and two or more applications of other application 314 grades are the layers whose coexistence is attained with the function provided from the system control layer 300 as expanded function.

[0022]Drawing 4 is a block diagram showing the hard structure of the image forming device concerning the embodiment of this invention. In this example, CPU311a, and 312a and 313a are given for every application of the copy application 311, the printer application 312, and the FAX application 313, The system control layer 300 and the device control layer 320 are controlled by one CPU301a. However, each application 311,312,313, the system control layer 300, and the hardware that gives CPU to each resource and transmits the command from the system control controller 301 to each controller 302,303,304,305 to it with a controlling signal line are also

considered. On the other hand, keycard apparatus is connected with a main part with the control line 401,402,403, and serial communication is used in this embodiment. Although the final controlling element control bus 410 for controlling the final controlling element 200 is shown in the figure, naturally carrying out by the exchange of a command using the above-mentioned controlling signal line is also considered. Thus, since system hard structure is constituted freely, the composition of drawing 3 is not mere illustration, and this invention is not necessarily limited to this composition.

[0023]In drawing 4, the page memories 311b, 312b, and 313b are formed in each application 311,312,313, respectively. The numerals 420 are image formation signal buses.

[0024]As the system control layer 300 shows to drawing 5 in which the relation between the application layer and a system control layer is shown in the digital image formation system of drawing 1, when it sees from the application layer 310, The function in which a virtual resource exists according to all the 311,312,313 applications is provided. It is not necessary to manage a system state and this function enables it to manage all the applications 311,312,313 on the same conditions in the system control layer 300 especially at the application layer 310. That is, the application 311,312,313 sends a using request to the system control layer 300, when a resource to use occurs. In the system control layer 300, a result is sent to request source application, judging from the resource operating condition in the time. In request source application, the right or wrong which can be performed are judged by a result, and if possible, it will perform. Fundamentally, execution right management is performed in an equivalent procedure.

[0025]In the system of drawing 3, there is a resource at a time only in one. For this reason, in the system control layer 300, when the virtual resource using request for every application 311,312,313 competes, in order to pass a actual resource royalty, it is necessary to perform exclusive control or a time sharing assignment. Whether a time sharing assignment is performed changes [ exclusive control or ] with the kind of resource, and user sets. The resource surrounded with the dashed line is a virtual resource, it is in the state where the right of execution (it displays in the case of a final controlling element) is not taken, and the resource surrounded as the solid line shows the state where the execution right was taken.

[0026]Drawing 6 is an explanatory view showing the interleave operation of the copy application 311 and the printer application 312. here -- the copy application 311 -- the "final controlling element" resource 200, the "image forming device" resource 110, and the "image reader" resource 130 -- it is under execution by taking all the execution right. If it is set to the enabled interleave mode by the user set when only the using request of the "image forming device" resource 110 comes from the printer application 312 at this time, the system control layer 300 will carry out time sharing assignment control of the "image forming device" resource 110. Time sharing assignment control changes the execution right of a resource dynamically among two or more applications. A copy application output and a printer application output are intermingled, and the output from this result "image forming device" resource 110 is outputted. Both waiting time can be suppressed by making a change possible to the minimum, without stopping the resource 110 during this period "an image forming device."

[0027]Drawing 7 is an explanatory view showing the parallel operation of the FAX application 313 and the printer application 312. Here, the fax application 313 has a right of a display of the final controlling element 200, and shows the parallel operation of the print operation of the printer application 312 and the FAX application 313. The FAX application 313 is a transmitting mode of a facsimile, etc., In the case where only the "final controlling element" resource 200 and the "image reader" resource 130 are used, the printer application 312 is when only the "image forming device" resources 110, such as a printer output, are required. Since competition of a resource does not occur in this state even if the FAX application 313 and the printer application 312 carry out a resource demand simultaneously, it is possible exclusion or for it not to be necessary to carry out time sharing allotment, and to accept the demand of both the applications 312,313. Therefore, operation of the printer application 312 and the FAX application 313 can completely be performed simultaneously.

[0028]Drawing 8 is a model figure showing the internal structure of the digital copier 100 of drawing 1. The manuscript allowance device 150, the image reader 130, the image forming device 110, and the sheet feeding device 120 are arranged from on the digital copier 100, respectively, and the double-sided machine 140 is attached to the body part side of the image forming device 110.

[0029]The pickup roller which the manuscript which the manuscript mounting base 151 was formed in the manuscript allowance device 150, and was placed on this manuscript mounting base 151 drives with the drive motor 152 and which is not illustrated, With a transportation roller and a transportation belt, it is sent in on the contact glass formed in the topmost part of the image reader 130, and paper is delivered after reading.

[0030]By the light source for lighting carried in the 1st running body and the 2nd running body which are not illustrated, and a mirror group, the image reader 130 leads the catoptric light from a manuscript to CCD, reads a manuscript, and drives [ publicly known ] said running body to a vertical scanning direction with the scanner drive

motor 131.

[0031]The image forming device 110 leads the laser beam modulated with the laser diode (LD) unit 111 based on the image data read by said CCD to the polygon mirror 113, Irradiate the photo conductor 114 electrified by the electrifying charger with the catoptric light from said polygon mirror 113 rotated with the polygon motor 112 at high speed, and an electrostatic latent image is formed, It is a thing of a publicly known structure to which paper is delivered after developing negatives with the development counter 116, transferring to a transfer medium (transfer paper) by the transfer section 117 and being established in the fixing part 118 with the toner to which this latent image is supplied from the toner bottle 115. The numerals 119 are the photosensor (P sensor) for detecting the concentration of the picture transferred.

[0032]Here the sheet feeding device 120 Two steps of feeding parts 121, and the manual feeding part 122, Feed Collo 123 and conveyance Collo 124 which take out a paper from these feeding parts 121,122, and are conveyed along the longitudinal conveying path 125, The resist roller 126 for taking the timing of the paper and picture which are conveyed, It mainly comprises the branching claw 128 which chooses delivery Collo 127 for delivering the paper which finished fixing in the fixing part 118 to the delivery unit 129, the course which leads the transfer paper with which the picture was formed in the whole surface to the double-sided machine 140, or course delivered to said delivery unit.

[0033]The reversal roller 142 with which the double-sided machine 140 reverses the paper as which the inverting path 141 by the side of a double-sided machine was chosen by the branching claw 128, It has the reversal nail 144 which sends a paper into the double-sided course 143 for leading again the paper reversed by this reversal roller 142 to the photo conductor side, the double-sided transportation roller 145 which sends a paper into the transfer section 117, and the double-sided conveyance sensor 146 which detects the paper led to the double-sided course 143. The double-sided course 143 is set up so that the lower end part of an upper bed part may correspond with the opening provided in the upstream rather than the resist roller 126 of said longitudinal conveying path 125 in accordance with the opening drawn by the branching claw 128 of the upper bed of said longitudinal conveying path 125.

[0034]In a profile, thus the constituted digital copier 100, in order to double the tip and timing of a picture which were formed in the photo conductor 114 by the resist roller 126 through the resist sensor which paper is fed to a paper and is not illustrated from the specified feeding part 121,122, it halts. On the other hand, by the polygon mirror 113, the laser beam generated with the LD unit 111 can be extended to the width of a picture, forms a latent image on the photo conductor 114, by making a toner adhere to the portion of a latent image with the development counter 116, forms a picture and is sent to the transfer section 117. The tip of the picture on the photo conductor 114 measures the timing which reaches the transfer section 117, and the paper made to stop in resist roller 126 position is conveyed from 126 copies of resist rollers, A picture is transferred on a paper by the transfer section 117, when passing the fixing part 118, heat and a pressure are established, and paper is delivered to the delivery unit 129.

[0035]The system used by this embodiment is a vertical carrier system which conveys a paper upward to the delivery unit 129 arranged from the feeding part 121,122 in the upper part as indicated also to drawing 8.

Therefore, the paper which escaped from the fixing part 118 is reversed, and the double-sided machine 140 which had a double-sided mechanism out of the main part is used as one means of the double-sided function again sent into the image formation part 110.

[0036]The branching claw 128 is leaned so that it may be conveyed at the double-sided machine 140 side, when changing the carrying path after the fixing part 118 by controlling the branching claw 128 located in the place which escaped from the fixing part 118 in a main part and using a double-sided function, as specifically shown in drawing 8. The paper which entered in the double-sided machine 140 reverses a transportation direction in the reversal roller part 142, and leads a paper to downward one by the change of the reversal nail 144. Furthermore, 145 copies of double-sided transportation rollers halted the paper using the double-sided conveyance sensor 146, paper was again fed to the paper in the main part with the feed start signal on the rear face of double-sided, and the double-sided function which sends into the transfer section 117 from the resist roller 126, and prints a rear face is realized.

[0037]When using such a double-sided machine 140 and a paper jam arises, as shown in drawing 9, the paper in the double-sided machine 140 opens double-sided machine 140 the very thing, and performs them from inside. The paper left behind in the main part once opens double-sided machine 140 main parts, and opens and removes the main part door 160 which is in it further.

[0038]By the way, when this kind of double-sided machine 140 is used, it is inefficient, if the double-sided copy is redone whenever it is generated by jam. Then, since it has the mechanism which can suspend a paper within the double-sided machine 140 when using such a double-sided machine 140, double-sided transportation roller 145 position is made to suspend the paper conveyed in the double-sided machine 140. therefore -- in after the

print job stop by jam -- the paper information in the double-sided machine 140 -- in other words, information with a paper is held as it is to 145 copies of double-sided transportation rollers. When jammed paper removal by a user is performed, like the above-mentioned, opening of the double-sided machine 140 is performed, opening of the main part door 160 is performed further, the remains paper in a main part is removed, the main part door 160 is shut in as reverse a procedure as the point, the double-sided machine 140 is shut, and it becomes release of jam. At this time, by leaving the paper information in the double-sided machine 140 as it is, the paper left behind in the double-sided machine 140 is treated as effective, and performs feeding after paper re feeding and out of the double-sided machine 140. This becomes possible to raise the productivity of the re printing operation after jam release.

[0039]The procedure at this time is shown in the flow chart of drawing 10. In this procedure, if generated by jam (Step 1001), the double-sided machine 140 will be opened wide (Step 1002), and a jammed paper will be removed (Step 1003). feeding from the double-sided machine 140 if removal of a jammed paper is completed, after shutting the main part door 160 and shutting the double-sided machine 140 further (Step 1004) -- waiting and feeding -- completing (Step 1005) -- processing is finished.

[0040]When the double-sided machine 140 is opened and it shuts again, the paper information in the double-sided machine 140 is held, but when it is in the state which the double-sided machine 140 is opening, the state where the paper in the double-sided machine 140 is removed by the user is also considered. So, when this state is detected, it becomes possible to recognize the paper information in the double-sided machine 140 certainly by repealing paper information in the double-sided machine 140. This procedure is shown in the flow chart of drawing 11.

[0041]In this processing, if generated by jam (Step 1101), the double-sided machine 140 will be opened wide (Step 1102), and it will be confirmed whether the paper in the double-sided machine 140 was removed (Step 1103). A jammed paper is removed if not removed (Step 1104). If removal of a jammed paper is completed, after shutting the main part door 160 and shutting the double-sided machine 140 further (Step 1105), processing will be finished if waiting and feeding complete feeding from the double-sided machine 140 (Step 1106). On the other hand, if the paper in the double-sided machine 140 is removed with the check of Step 1103, the paper information in the double-sided machine 140 will be cleared, and processing (Step 1107) will be finished. Whether when open at that time 140, i.e., a double-sided machine, the paper in the double-sided machine 140 was extracted uses the conveyance sensor 146 used for conveyance in the double-sided machine 140. It becomes unnecessary to introduce composition special to detection of the paper existence in the double-sided machine 140 when the double-sided machine 140 is open by carrying out like this.

[0042]Thus, according to the image forming system concerning this embodiment. It not only becomes possible to make it operate simultaneously by controlling expanded function, such as the copy application 311, the printer application 312, and the FAX application 313, by the system control layer 300, but, When the paper by which image formation was carried out to the whole surface into the double-sided machine 140 after the end of jam processing when these functions were performed using the double-sided machine 140 and a paper jam sometimes arose remains, it can become possible to supply the paper, and for it to be alike on the other hand, and to make image formation perform, and the productivity of image formation can be raised. Therefore, these processings are performed by the system controller in the system control layer 300.

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## DESCRIPTION OF DRAWINGS

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**[Brief Description of the Drawings]**

**[Drawing 1]**It is a perspective view showing the appearance of the digital copier concerning one embodiment of this invention.

**[Drawing 2]**It is a top view showing the final controlling element of the digital process copying machine of drawing 1.

**[Drawing 3]**It is a block diagram showing the system software composition of the digital copier of drawing 1.

**[Drawing 4]**It is a block diagram showing the system hard structure of the digital copier of drawing 1.

**[Drawing 5]**It is an explanatory view showing the relation of the application layer and the system control layer in the digital copier of drawing 1.

**[Drawing 6]**It is an explanatory view showing the interleave operation of the copy application in the digital copier of drawing 1, and printer application.

**[Drawing 7]**It is an explanatory view showing the parallel operation of the FAX application in the digital copier of drawing 1, and printer application.

**[Drawing 8]**It is a model figure showing the internal configuration of the digital copier of drawing 1.

**[Drawing 9]**It is a figure showing the state where the double-sided machine and main part door of the digital copier of drawing 1 were opened wide.

**[Drawing 10]**It is a flow chart which shows the procedure at the time of the jam processing in this embodiment.

**[Drawing 11]**It is a flow chart which shows other procedure at the time of the jam processing in this embodiment.

**[Description of Notations]**

100 Digital copier

110 Image forming device

120 Sheet feeding device

130 Image reader

140 Double-sided machine

150 Manuscript allowance device

160 Main part door

142 Reversal roller

144 Reversal nail

145 Double-sided transportation roller

146 Double-sided conveyance sensor

300 System control layer

301 System controller

310 Application layer

311 Copy application

312 Printer application

313 FAX application

320 Device control layer

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[Translation done.]

**\* NOTICES \***

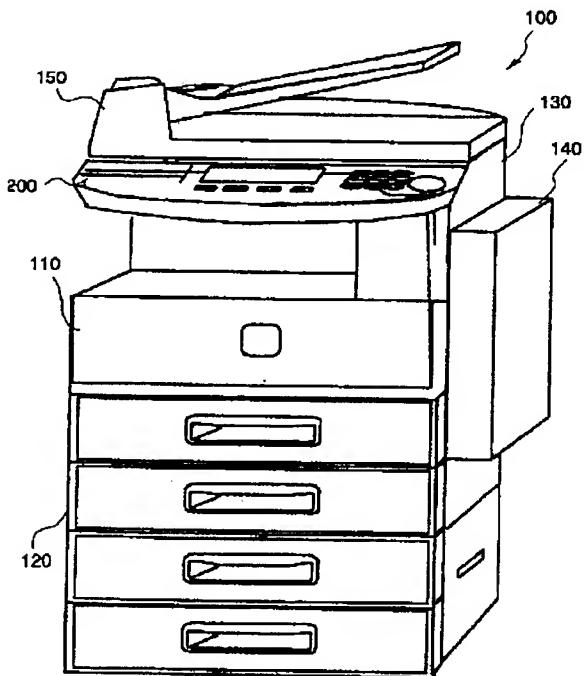
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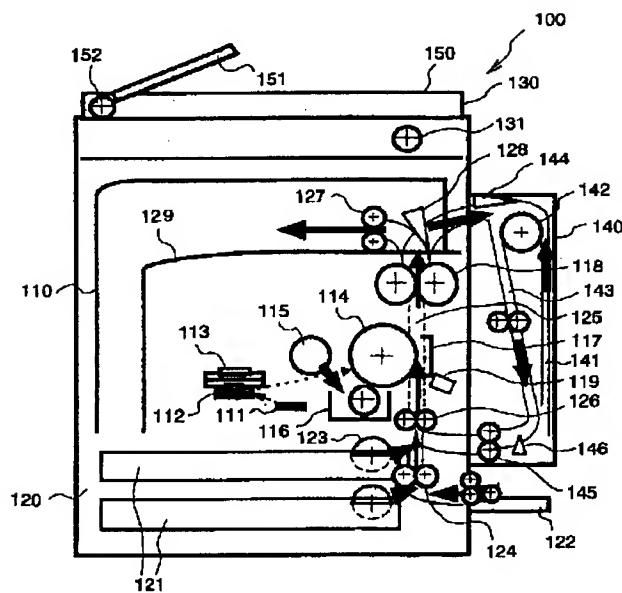
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**DRAWINGS****[Drawing 1]**

【図1】

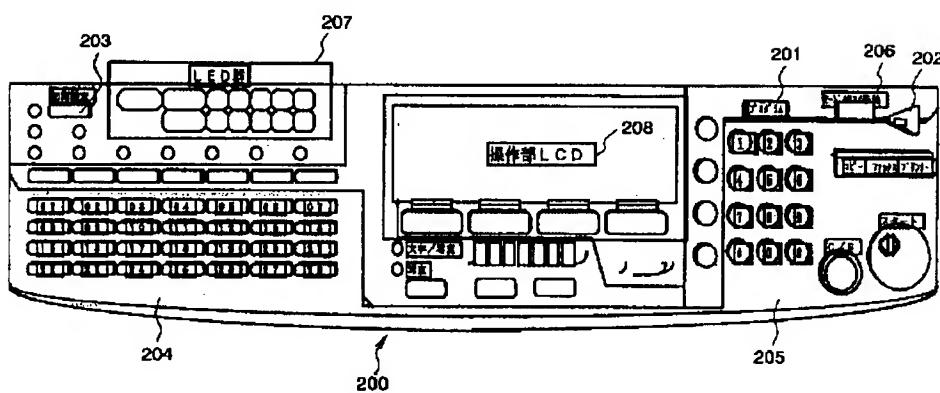
**[Drawing 8]**

【図 8】



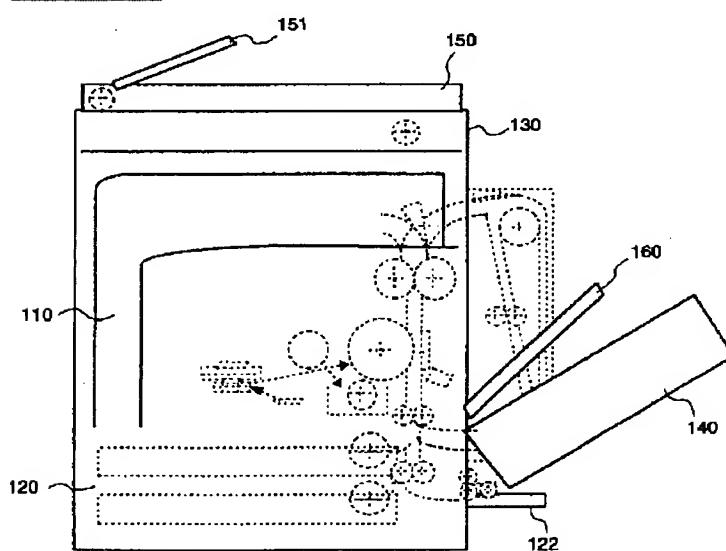
[Drawing 2]

【図 2】

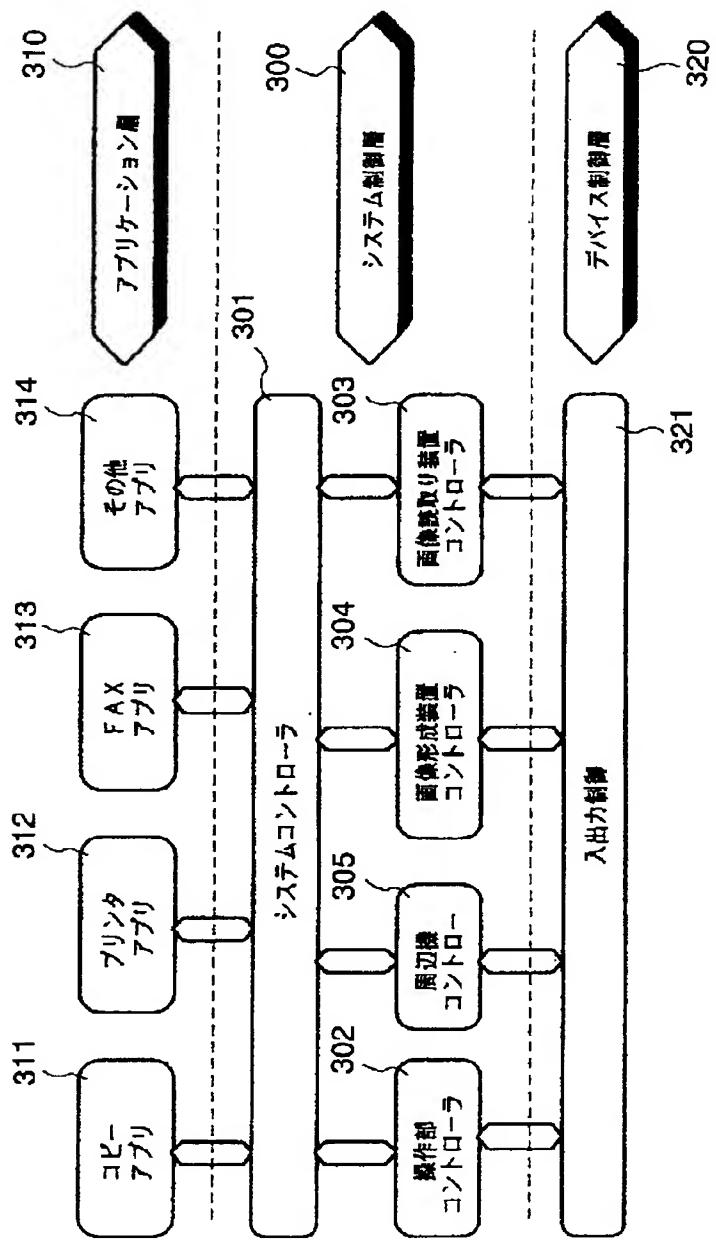


[Drawing 9]

【図 9】

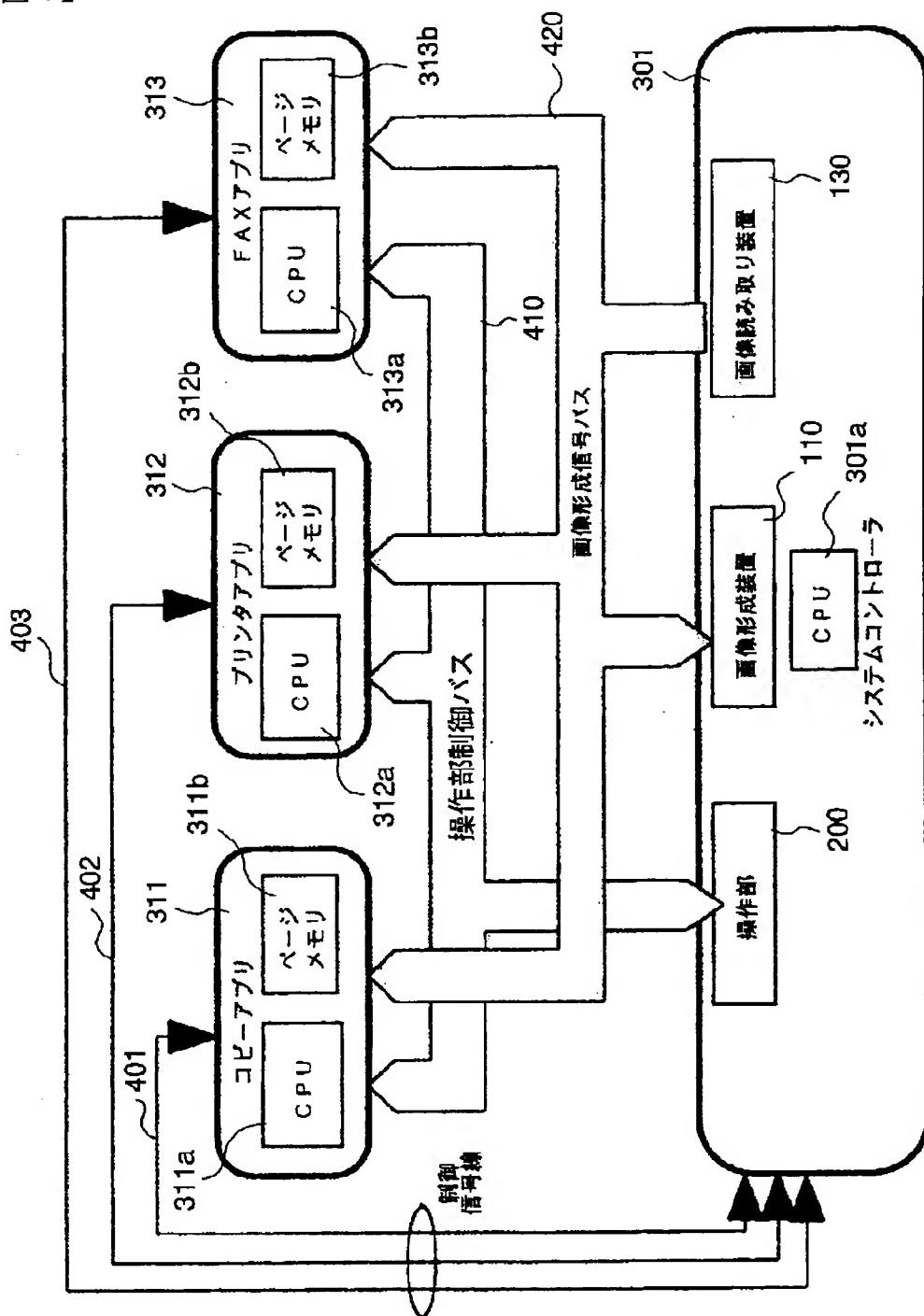


[Drawing 3]  
[図3]



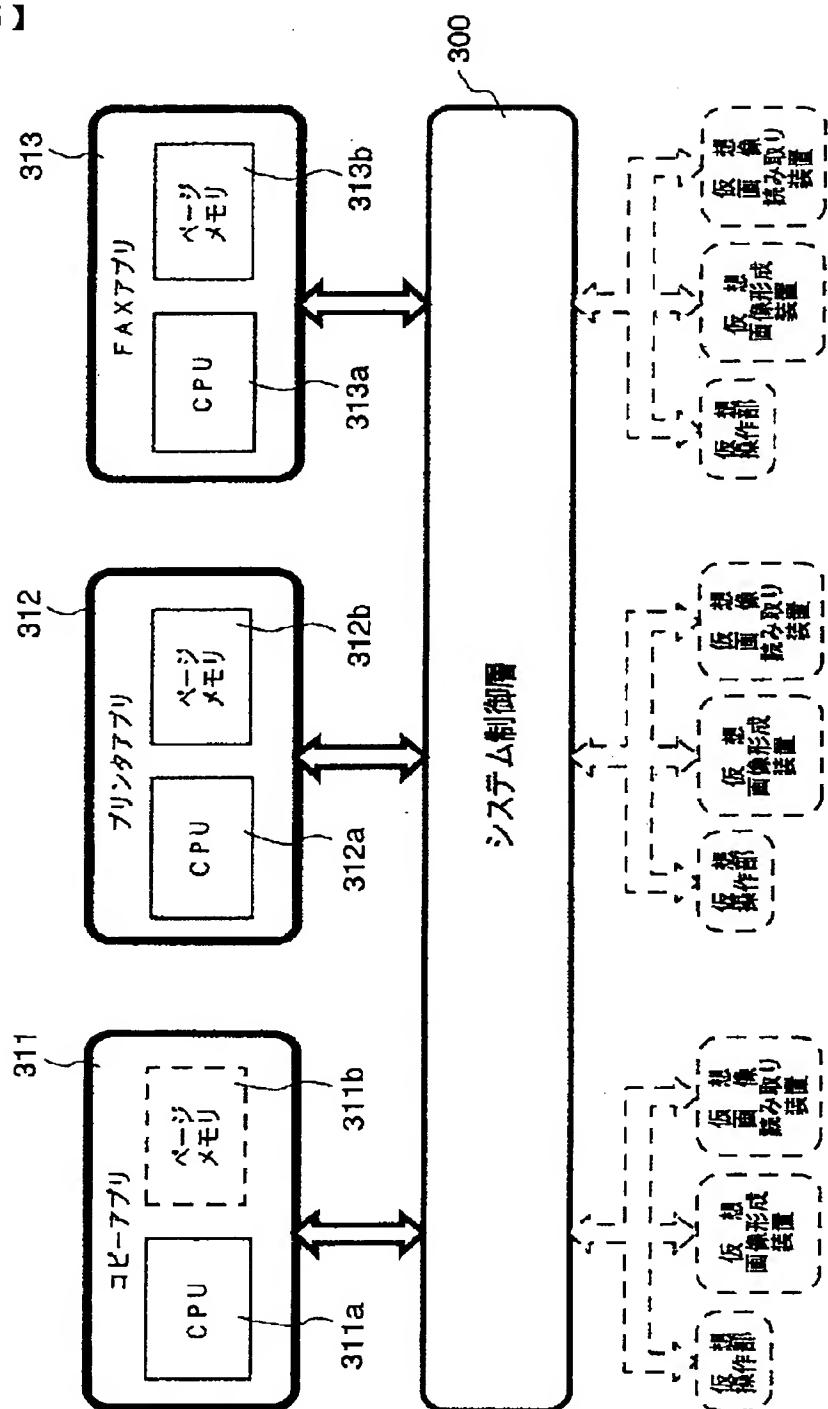
[Drawing 4]

[図 4]



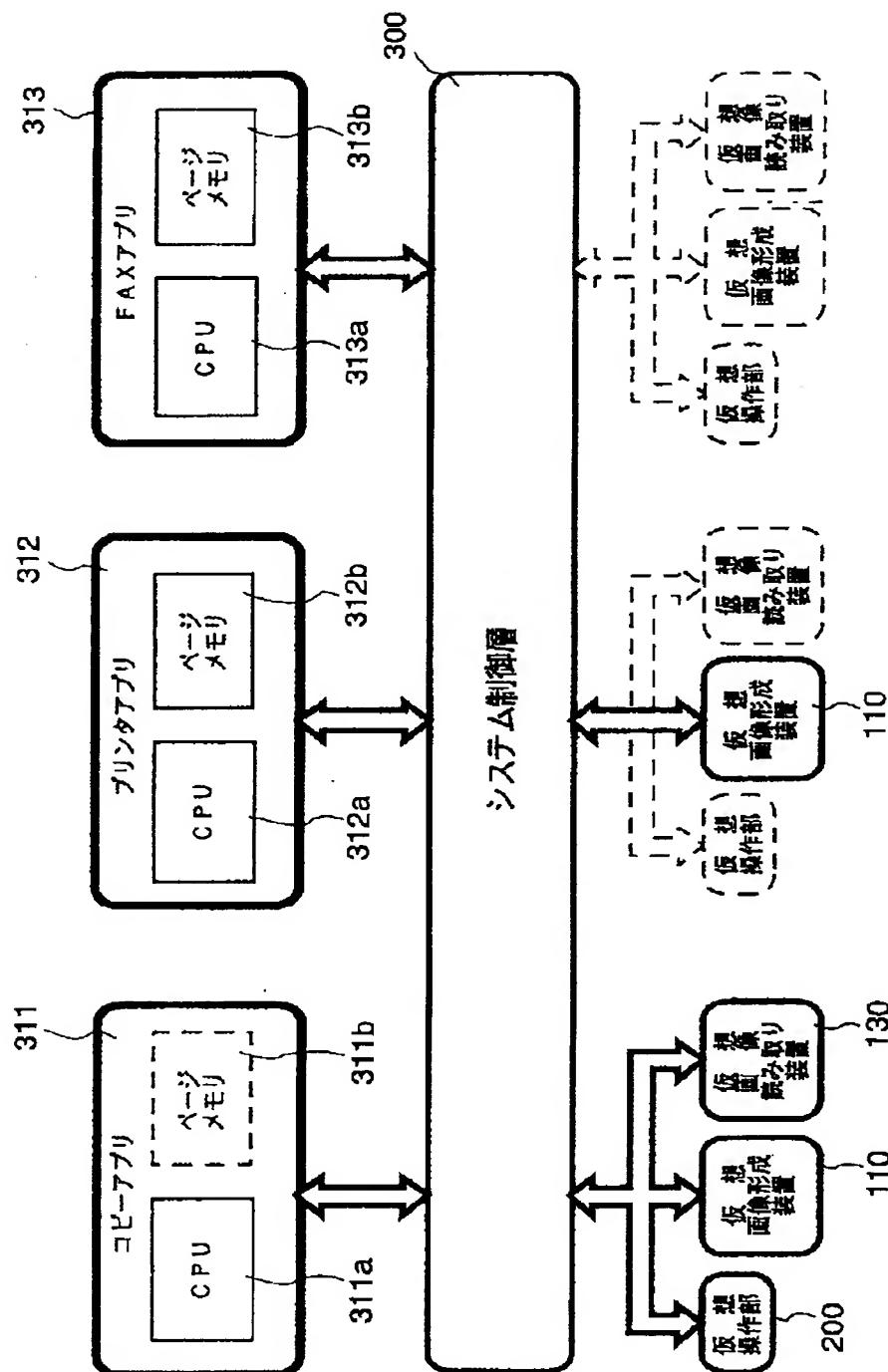
[Drawing 5]

[図5]



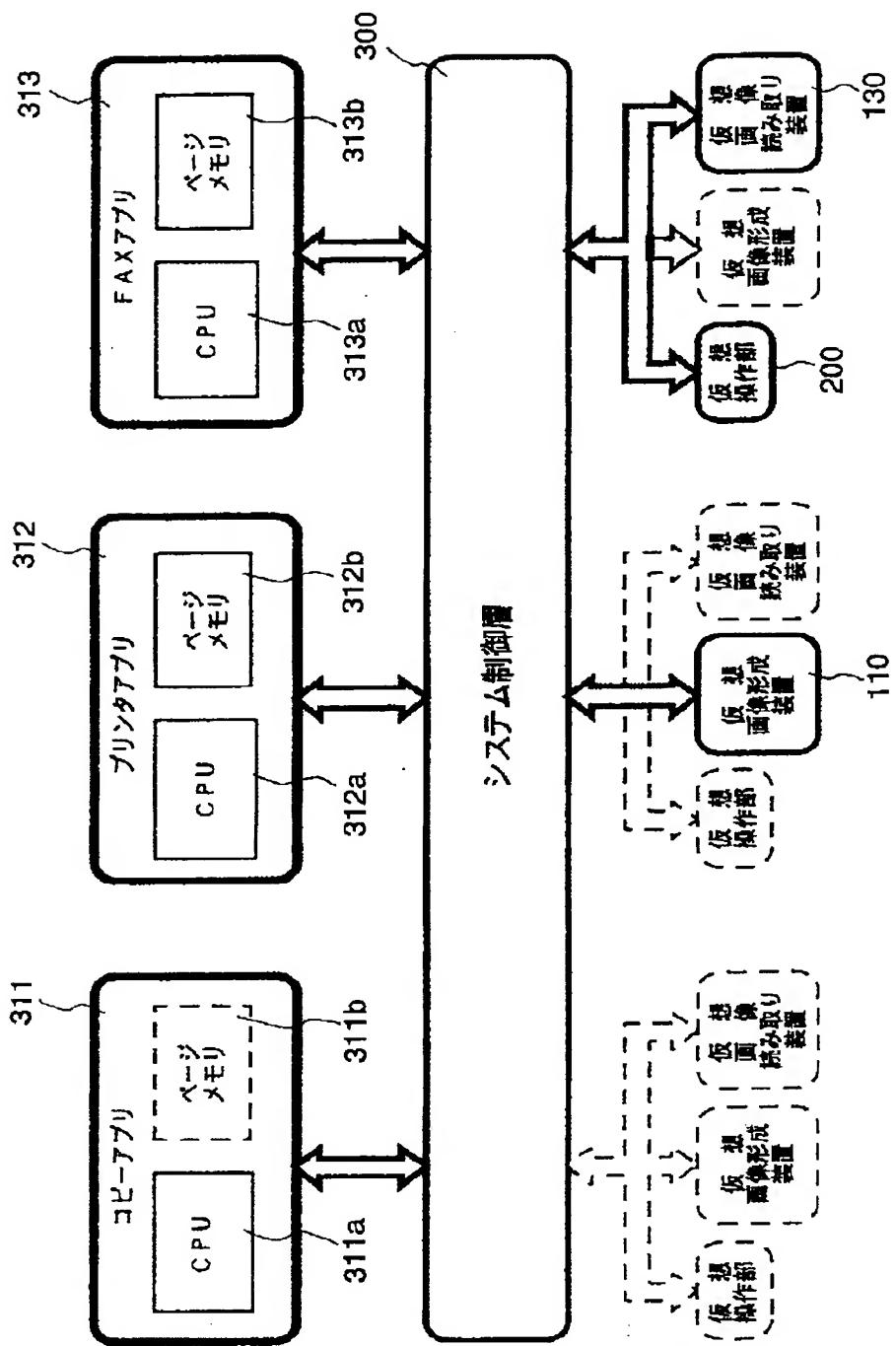
[Drawing 6]

【図6】



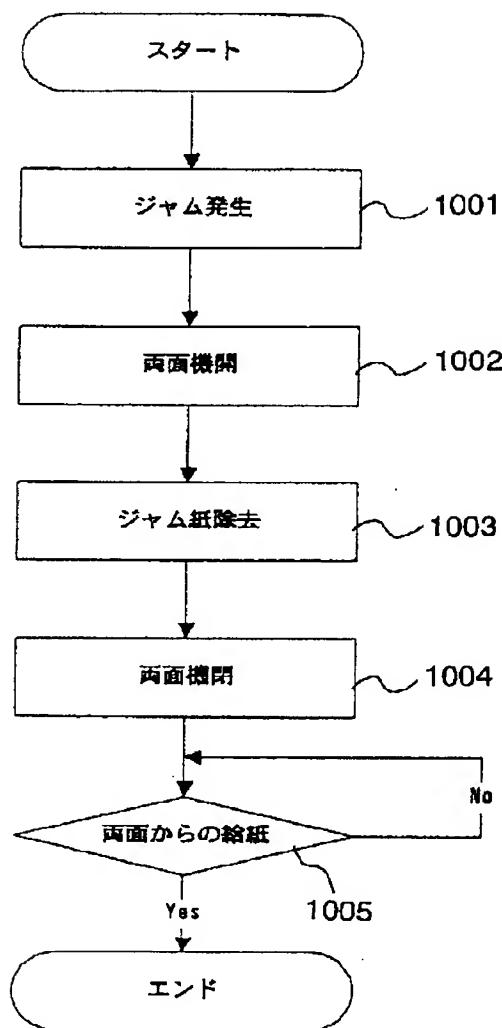
[Drawing 7]

【図7】



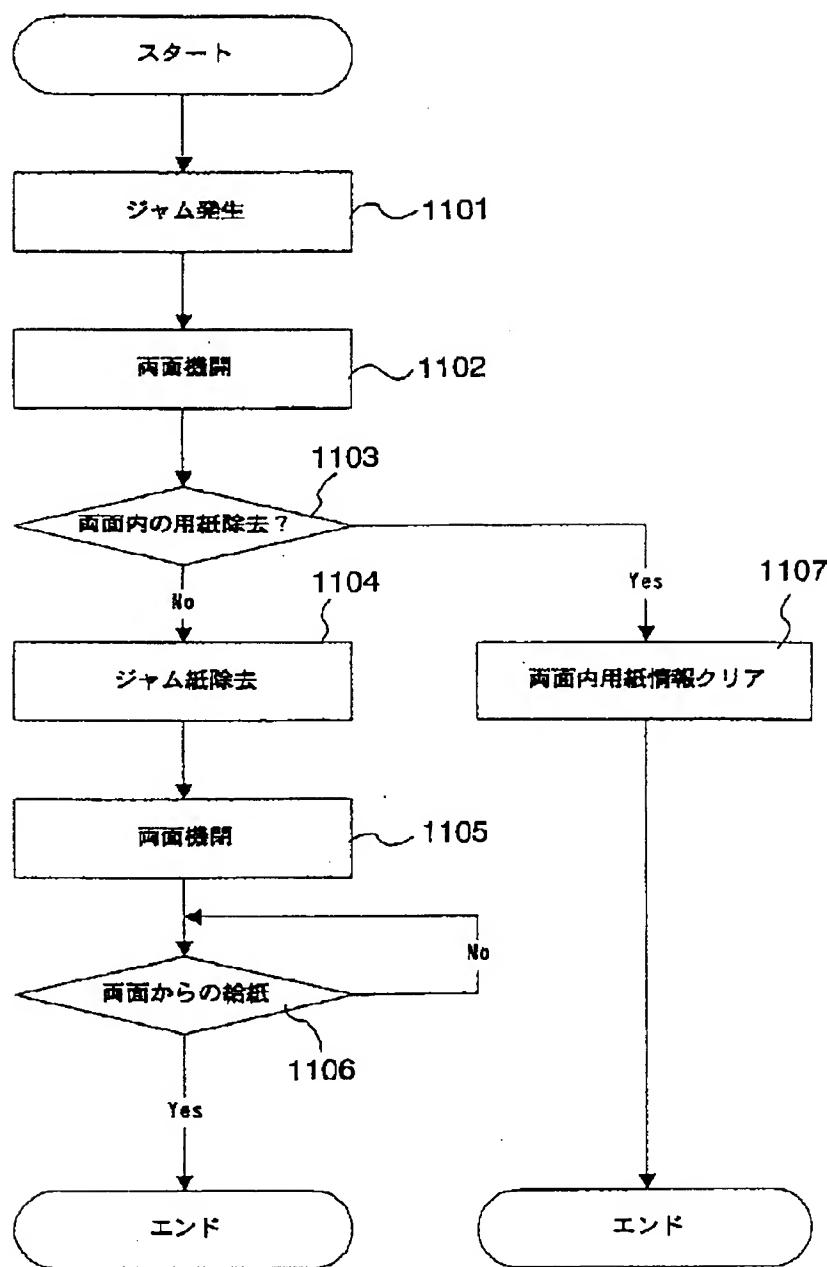
[Drawing 10]

【図 10】



[Drawing 11]

【図11】



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## CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the regulation of 2 of Article 17 of Patent Law

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[Amendment 1]

[Document to be Amended] Specification

[Item(s) to be Amended] The name of an invention

[Method of Amendment] Change

[The contents of amendment]

[Title of the Invention] Image forming device

[Amendment 2]

[Document to be Amended] Specification

[Item(s) to be Amended] Claim

[Method of Amendment] Change

[The contents of amendment]

[Claim(s)]

[Claim 1] In an image forming device provided with a double-sided machine which is made to reverse a paper and is conveyed to the image forming means side,

A means to make said double-sided inside of a plane suspend a paper of at least one sheet,

A means which controls by validating a paper of the double-sided inside of a plane when the double-sided machine concerned is opened and closed, where a paper is stopped in a double-sided mechanism, preparation \*\*\*\*\* -- an image forming device characterized by things.

[Claim 2] The image forming device according to claim 1 when a means to perform said control is detected [ that a paper of the double-sided inside of a plane was removed in the state where said double-sided machine was wide opened to a case ], wherein it repeats a paper of the double-sided inside of a plane.

[Claim 3] The image forming device according to claim 2, wherein detection of a paper having been removed is performed by a sensor used for paper conveyance.

[Claim 4] The image forming device according to claim 1 or 2, wherein said double-sided machine is attached to

an outside surface of an image forming device body, enabling free attachment and detachment.

[Claim 5] It is an image forming device given in any 1 paragraph of claims 1 thru/or 4 in which expansion is possible by connecting various applications.

[Claim 6] The image forming device according to claim 5, wherein said expansion contains at least one of a copy function, a facsimile function, and the printer functions.

[The amendment 3]

[Document to be Amended] Specification

[Item(s) to be Amended] 0001

[Method of Amendment] Change

[The contents of amendment]

[0001]

[Field of the Invention]

This invention relates to image forming devices, such as a digital copier which are provided with a double-sided machine and forms a picture according to the inputted image data. For example, it has two or more application functions, such as a copy function, a facsimile function, and a printer function, and is related with a suitable image forming device to form a picture according to application.

[Amendment 4]

[Document to be Amended] Specification

[Item(s) to be Amended] 0005

[Method of Amendment] Change

[The contents of amendment]

[0005]

Other purposes are to enable it to recognize the paper information of the double-sided inside of a plane certainly at the same time they raise the productivity in the case of performing re printing operation after jam removal when it is generated in the image forming device of the same gestalt by the jam without regards to a double-sided machine at the time of double-sided passage of sheets.

[Amendment 5]

[Document to be Amended] Specification

[Item(s) to be Amended] 0006

[Method of Amendment] Change

[The contents of amendment]

[0006]

[Means for Solving the Problem]

This invention is provided with the following in order to attain said purpose.

A means to make the double-sided inside of a plane suspend a paper of one sheet thru/or two or more sheets in an image forming device provided with a double-sided machine which is made to reverse a paper and is conveyed to the image forming means side.

A means which controls by validating a paper of the double-sided inside of a plane when the double-sided machine concerned is opened and closed, where a paper is stopped in a double-sided mechanism.

[Amendment 6]

[Document to be Amended] Specification

[Item(s) to be Amended] 0008

[Method of Amendment] Change

[The contents of amendment]

[0008]

The image forming device of this means can plan expansion by connecting various applications, and at least one of a copy function, a facsimile function, and the printer functions is contained in the expansion by said various applications.

[Amendment 7]

[Document to be Amended] Specification

[Item(s) to be Amended] 0010

[Method of Amendment] Change

[The contents of amendment]

[0010]

Drawing 1 is a perspective view showing the appearance of the digital copier as an image forming device which has two or more application functions concerning the embodiment of this invention. This digital copier 100 the

image forming device 110, the sheet feeding device 120 which is in the lower part of the image forming device 110, and was provided with the multi stage feeding part, the image reader 130 which is in the upper part of the image formation part 110, and reads the picture of a manuscript etc., and the paper with which the picture was formed in one side. It comprises the double-sided machine 140 which makes it reversed, sends into the image forming device 110, and makes a picture form in both sides, and the manuscript allowance device 150 which sends a manuscript into the image reader 130 automatically, and makes it read it. The final controlling element 200 as shown also in drawing 2 is formed in the upper surface of the image forming device 110, and an operator can input various directions now to the sheet feeding device 120, the image reader 130, the double-sided machine 140, and the manuscript allowance device 150 which were connected to the image forming device 110.

[Amendment 8]

[Document to be Amended]Specification

[Item(s) to be Amended]0024

[Method of Amendment]Change

[The contents of amendment]

[0024]

As the system control layer 300 shows to drawing 5 in which the relation between the application layer and a system control layer is shown in the digital process copying machine of drawing 1, when it sees from the application layer 310, The function in which a virtual resource exists according to all the 311,312,313 applications is provided. It is not necessary to manage a system state and this function enables it to manage all the applications 311,312,313 on the same conditions in the system control layer 300 especially at the application layer 310. That is, the application 311,312,313 sends a using request to the system control layer 300, when a resource to use occurs. In the system control layer 300, a result is sent to request source application, judging from the resource operating condition in the time. In request source application, the right or wrong which can be performed are judged by a result, and if possible, it will perform. Fundamentally, execution right management is performed in an equivalent procedure.

[Amendment 9]

[Document to be Amended]Specification

[Item(s) to be Amended]0042

[Method of Amendment]Change

[The contents of amendment]

[0042]

Thus, according to the digital copier concerning this embodiment. It not only becomes possible to make it operate simultaneously by controlling expanded function, such as the copy application 311, the printer application 312, and the FAX application 313, by the system control layer 300, but, When the paper by which image formation was carried out to the whole surface into the double-sided machine 140 after the end of jam processing when these functions were performed using the double-sided machine 140 and a paper jam sometimes arose remains, it can become possible to supply the paper, and for it to be alike on the other hand, and to make image formation perform, and the productivity of image formation can be raised. Therefore, these processings are performed by the system controller in the system control layer 300.

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[Translation done.]

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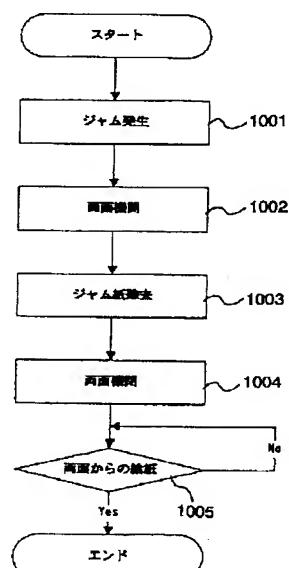
### (54)【発明の名称】 画像形成システム

#### (57)【要約】

【課題】 両面通紙時に両面機に関わらないジャムが発生したときのジャム除去後の再印刷動作を行う場合の生産性を高める。

【解決手段】 用紙を反転させて画像形成手段側に搬送するデジタル複写機本体に外付けされる両面機と、前記両面機内に1枚ないし複数枚の用紙を停止させる手段と、両面機構内に用紙を停止させた状態で当該両面機を開閉したとき、両面機内の用紙を有効として制御を行うシステムコントローラとを備えている。このシステムコントローラは、ジャムが発生すると(ステップ1001)、両面機140を開放し(ステップ1002)、ジャム紙を除去する(ステップ1003)。ジャム紙の除去が完了すると本体ドア160を閉め、さらに両面機140を閉めた後(ステップ1004)、両面機140からの給紙を待ち、給紙が完了する(ステップ1005)と処理を終える。

【図10】



## 【特許請求の範囲】

【請求項1】用紙を反転させて画像形成手段側に搬送する両面機を備えた画像形成システムにおいて、前記両面機内に少なくとも1枚の用紙を停止させる手段と、両面機構内に用紙を停止させた状態で当該両面機を開閉したとき、両面機内の用紙を有効として制御を行う手段と、を備えていることを特徴とする画像形成システム。

【請求項2】前記制御を行う手段は、前記両面機を筐体に対して開放した状態において両面機内の用紙が取り除かれたことを検出した場合に両面機内の用紙を無効とすることを特徴とする請求項1記載の画像形成システム。

【請求項3】用紙が取り除かれたことの検出が、用紙搬送に使用するセンサによって行われることを特徴とする請求項2記載の画像形成システム。

【請求項4】前記両面機が画像形成装置本体の外面に着脱自在に取り付けられていることを特徴とする請求項1または2記載の画像形成システム。

【請求項5】各種アプリケーションを連結することによって機能拡張が可能な請求項1ないし4のいずれか1項に記載の画像形成システム。

【請求項6】前記機能拡張が、コピー機能、ファクシミリ機能、プリンタ機能の少なくとも1つを含むことを特徴とする請求項5記載の画像形成システム。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、両面機を備え、入力された画像データに応じて画像を形成するデジタル複写機などの画像形成システムに係り、例えば、コピー機能、ファクシミリ機能、プリンタ機能などの複数のアプリケーション機能を備え、アプリケーションに応じて画像を形成するのに好適な画像形成システムに関する。

## 【0002】

【従来の技術】複数のアプリケーションに対応した機能を有するデジタル複写機では、例えば、用紙を給紙トレイから上方にある排紙トレイへと上に向かって搬送する縦搬送システムを採用したものが知られている。このような縦搬送システムのものでは、さらに、縦搬送する本体の外側に用紙を反転させるいわゆる両面機構を有する両面機が付属するものも知られている。

## 【0003】

【発明が解決しようとする課題】このようなデジタル複写機では、複写機本体内で生じた用紙ジャムを取り除くときは、両面機自体を一端開けて、それから本体ドアを開けてジャム紙の除去を行う必要がある。そのとき、搬送上の問題もあり両面機内に用紙が存在していても両面機が開いた時点でその用紙をジャムとして扱っていたため、ジャムしていない用紙を無駄にする結果となっていた。

【0004】本発明は、このような従来技術の問題点に鑑みてなされてもので、その目的は、両面通紙時に両面機に関わらないジャムが発生したときのジャム除去後の再印刷動作を行う場合の生産性を高めることにある。

【0005】他の目的は、同様の形態の画像形成システムにおいて両面通紙時に両面機に関わらないジャムが発生したときのジャム除去後の再印刷動作を行う場合の生産性を上げると同時に、確実に両面機内の用紙情報を認識できるようにすることにある。

## 【0006】

【課題を解決するための手段】前記目的を達成するため、本発明は、用紙を反転させて画像形成手段側に搬送する両面機を備えた画像形成システムにおいて、両面機内に1枚ないし複数枚の用紙を停止させる手段と、両面機構内に用紙を停止させた状態で当該両面機を開閉したとき、両面機内の用紙を有効として制御を行う手段とを備えた構成とした。

【0007】この場合、前記制御を行う手段は、前記両面機を筐体に対して開放した状態において両面機内の用紙が取り除かれたことを検出した場合に両面機内の用紙を無効とする。用紙が取り除かれたことの検出については、用紙搬送に使用するセンサによって行うようになるとよい。また、前記両面機は画像形成装置本体の外面に着脱自在に取り付けられるものである。

【0008】なお、この手段の画像形成システムは、各種アプリケーションを連結することによって機能拡張を図ることが可能であって、前記各種アプリケーションによる機能拡張には、コピー機能、ファクシミリ機能、プリンタ機能の少なくとも1つが含まれる。

## 【0009】

【発明の実施の形態】以下、図面を参照し、本発明の一実施の形態について説明する。

【0010】図1は本発明の実施形態に係る複数のアプリケーション機能を有する画像形成システムとしてのデジタル複写機の外観を示す斜視図である。このデジタル複写機100は画像形成装置110、画像形成装置110の下部にあって多段の給紙部を備えた給紙装置120、画像形成部110の上部にあって原稿などの画像を読み取る画像読み取り装置130、片面に画像が形成された用紙を反転させて画像形成装置110に送り込み両面に画像を形成させる両面機140、および原稿を画像読み取り装置130に自動的に送り込んで読み取らせる原稿仕送り装置150から構成されている。画像形成装置110の上面には図2にも示すような操作部200が設けられ、画像形成装置110に接続された給紙装置120、画像読み取り装置130、両面機140および原稿仕送り装置150に対してオペレータが各種指示の入力を行えるようになっている。

【0011】操作部200には、図2から分かるように右側上部にプログラム登録／呼び出しキー201、割り

込みキー202、アプリケーション切り替えキー206が配され、プログラム登録／呼び出しキー201の下部にテンキー205が、また、左側上部に初期設定キー203が、その下部にFAX用短縮キー群204が、その上部にLED群207がそれぞれ配され、さらに、中央部に操作部LCD208が設けられている。

【0012】プログラム登録／呼び出しキー201はプログラムモードの登録や呼び出しに用いられる。初期設定キー203は初期設定を行うときに使用される。FAX用短縮キー群204の[01]～[28]までのキーはファクシミリモードのプログラムの割り当てに使用される。テンキー205は[0]～[9]間でのキーは種々の設定を行う他、コピーモードのプログラムの割り当てに使用される。また、アプリケーション切り替えキー206はコピー、ファックス、プリンターの各アプリケーションへの切り替えキーで、押下されたキーに相当するアプリケーションへ操作部表示権を譲渡する。

【0013】画像読み取り装置130は、光源を原稿に照射し、その反射光を固体作像素子(CCD)で電気信号に変換し、必要な画像処理を行う機能を持った装置であり、機構自体は公知なので、ここでの説明は省略する。画像形成装置110は、電気信号で送られた画像イメージを電子写真、感熱、熱転写、インクジェット等の手段により普通紙、感熱紙等に形成する装置である。

【0014】デジタル複写機100の大きな特徴に、画像を電気信号に変換して読み込み、電気信号を画像形成装置110で復元するという機能がある。このとき読み取った電気信号を様々に変化、伝達する手段を持つことにより複写機以外の分野に応用可能となる。前述のファックス、プリンタ以外にスキャナ、ファイルシステム等応用範囲は非常に広い。これらの拡張機能を「アプリケーション」と称する。

【0015】前述の画像読み取り装置130で変換された画像の電気信号、画像形成装置110へ入力される画像の電気信号、及び画像の電気信号と同期をとるための信号をまとめて「ビデオ信号」と表現する。ビデオ信号を画像読み取り装置130、画像形成装置110、およびアプリケーション間でやりとりするためには、装置間で情報を伝達しあう必要がある。この手段を「制御信号」または「コマンド」発行と表現する。

【0016】最近のデジタル複写機100では、アプリケーションを1つ登載するのみでなく複数のアプリケーションを同時登載するようになってきた。この様に1つの資源を共有するデジタル複写機を「システム」と表現し、このシステムを制御するコントローラを「システム制御」、「システムコントローラ」と表現する。また、複数のアプリケーションで共有される機能ユニット単位を「資源」、「リソース」と表現する。前述のシステムコントローラは、このリソース単位でシステム制御を行っている。本件のデジタル複写機100で管理している

資源としては、画像読み取り装置130、画像形成装置110、操作部200、メモリ、および両面器140に代表される周辺機(DF=原稿仕送り装置、ソーター等)がある。

【0017】「差し込み出力」は主に画像出力時の動作説明で用いられる。通常画像出力は、目的を同じくする一連の動作(=1ジョブ)を完了するまで他の動作は実行しない。例えば最近のデジタル複写機では機能が複合され、複写機+FAXまたはプリンタあるいはそれ以上の組み合わせを1台に集約している。しかし、そのほとんどが例えば複写機能が終了してからプリンタ出力に切り替える様に機能単位(=ジョブ単位)の出力をしている。これに対して、1ジョブの出力に他のジョブ出力を差し込んで出力する事を「インターリープ」と表現する。例えば複写機の出力中に、プリンタ出力を機械動作を止めることなく実現する。

【0018】また、「初期設定」とは、よく使用する条件に合わせて、各機能の初期設定値を変更したり、操作の条件を設定することを示し、初期設定には複写機システム全般の機能の設定を行う「システム初期設定」とコピーモードの機能の設定に限定した「コピー初期設定」とファクシミリモードの機能の設定に限定した「ファックス初期設定」等がある。たとえば、「システム初期設定」にはキー操作後、一定時間なにも操作を行わなかったときに電源を入れたときの状態に戻す「オートクリア時間の設定」等があり、「コピー初期設定」にはセットできるコピー枚数の上限を変更する「コピーセット枚数制限の設定」や、「片面→両面」コピーで、裏面の左とじ代幅の設定が可能な「両面コピー左とじ幅」等がある。「ファックス初期設定」には受信した時間を印字する機能を選択する「受信時刻印字の設定」や、よく使用する相手の電話番号を登録する「宛先登録」等がある。

【0019】図3は本実施形態に係るデジタル複写機のシステムソフト構成を示すブロック図である。マルチタスク型のシステムを構成するためには、機能単位をリソースとして扱い、1つのリソースを複数のアプリケーションで共有するための管理を行なう必要がある。この管理を行うのが図3に示すシステム制御層300であり、この他にアプリケーション層310とデバイス制御層320が設けられている。

【0020】システム制御層300はシステム制御部301と、操作部200、画像読み取り装置130、画像形成装置110および両面機140等の周辺機の各コントローラ302、303、304、305により構成される。

【0021】デバイス制御層320は、システム制御層300からのコマンド、制御信号等の論理的指示から、実際に装置を動かすためにクラッチ、センサ、モータ等の機械的入出力を駆動、入力する変換(入出力制御321)を行っている。アプリケーション層310は、拡張

機能としてコピーアプリケーション311、プリンタアプリケーション312、FAXアプリケーション313、その他のアプリケーション314等の複数アプリケーションがシステム制御層300から提供される機能により共存可能となる層である。

【0022】図4はこの発明の実施形態に係る画像形成装置のハード構成を示すブロック図である。この例では、コピーアプリケーション311、プリンタアプリケーション312、FAXアプリケーション313の各アプリケーション毎にCPU311a, 312a, 313aを持たせ、システム制御層300、デバイス制御層320を1個のCPU301aで制御している。しかし、各アプリケーション311, 312, 313、システム制御層300、各リソースにCPUをもたせシステム制御コントローラ301から各コントローラ302, 303, 304, 305へのコマンドを制御信号線で伝達するハードウェアも考えられる。一方、キーカード機器は本体と制御線401, 402, 403で接続され、本実施形態においてはシリアル通信を用いている。また、同図には、操作部200の制御を行う為の操作部制御バス410があるが、前述の制御信号線を用いたコマンドのやりとりで行うことも当然考えられる。このようにシステム・ハード構成は自由に構成されるため図3の構成は単なる例示であり、本発明がこの構成に限定されるわけがない。

【0023】なお、図4において、各アプリケーション311, 312, 313にはそれぞれページメモリ311b, 312b, 313bが設けられている。また、符号420は画像形成信号バスである。

【0024】システム制御層300では、図1のデジタル画像形成システムにおいてアプリケーション層とシステム制御層の関係を示す図5に示すようにアプリケーション層310から見た場合、全てのアプリケーション311, 312, 313個別に仮想リソースが存在するような機能を提供する。この機能によってアプリケーション層310では特にシステム状態を管理する必要がなく、システム制御層300では全てのアプリケーション311, 312, 313を同一条件で管理することが可能となる。すなわちアプリケーション311, 312, 313は使用したいリソースが発生した時点で、システム制御層300に使用要求を送る。システム制御層300ではその時点でのリソース使用状況から判断して要求元アプリケーションに結果を送る。要求元アプリケーションでは結果により実行可能の是非を判断し、可能であれば実行する。基本的には同等の手順で実行権管理を行う。

【0025】図3のシステムでは、リソースは1つずつしかない。このためシステム制御層300ではアプリケーション311, 312, 313毎の仮想リソース使用要求が競合した場合、実際のリソース使用権を渡すため

に排他制御または時分割割付を行う必要がある。排他制御か時分割割付を行うかはリソースの種類、ユーザ設定により異なってくる。なお、破線で囲まれたリソースは仮想リソースであり、実行（操作部の場合は表示）権をとっていない状態で、実線で囲まれたリソースは実行権をとった状態を示す。

【0026】図6はコピーアプリケーション311とプリンタアプリケーション312のインターリープ動作を示す説明図である。ここでは、コピーアプリケーション311は、「操作部」リソース200、「画像形成装置」リソース110、「画像読み取り装置」リソース130全ての実行権をとって実行中である。このときプリンタアプリケーション312から「画像形成装置」リソース110の使用要求のみがきた場合、ユーザ設定でインターリープモード可能に設定されていると、システム制御層300は「画像形成装置」リソース110を時分割割付制御する。時分割割付制御はリソースの実行権を複数アプリ間で動的に変更する。この結果「画像形成装置」リソース110からの出力は、コピーアプリケーション出力とプリンターアプリケーション出力が混在して出力される。この間「画像形成装置」リソース110を停止すること無く変更可能とすることにより両者の待ち時間を最小限に抑えられる。

【0027】図7はFAXアプリケーション313とプリンタアプリケーション312との並列動作を示す説明図である。ここではファックスアプリケーション313が操作部200の表示権を有し、プリンタアプリケーション312とFAXアプリケーション313の印刷動作の並列動作を示している。FAXアプリケーション313は例えば、ファクシミリの送信モード等で、「操作部」リソース200と「画像読み取り装置」リソース130のみを使用する場合で、プリンタアプリケーション312はプリンタ出力などの「画像形成装置」リソース110のみが必要な場合である。この状態では、FAXアプリケーション313とプリンタアプリケーション312が同時にリソース要求してきても、リソースの競合が発生しないため、排他または時分割割り付けする必要なく両アプリケーション312, 313の要求を受け入れることが可能である。したがって、プリンタアプリケーション312とFAXアプリケーション313の動作は全く同時にできる。

【0028】図8は図1のデジタル複写機100の内部構造を示すモデル図である。デジタル複写機100の上から原稿仕送り装置150、画像読み取り装置130、画像形成装置110、給紙装置120がそれぞれ配置され、画像形成装置110の本体部側面に両面機140が取り付けられている。

【0029】原稿仕送り装置150には原稿載置台151が設けられ、この原稿載置台151上に置かれた原稿が駆動モータ152によって駆動される図示しないピッ

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クアップローラ、搬送ローラおよび搬送ベルトによって画像読み取り装置130の最上部に設けられたコンタクトガラス上に送り込まれ、読み取り後、排紙される。

【0030】画像読み取り装置130は図示しない第1走行体および第2走行体に搭載された照明用光源、ミラー群によってCCDに原稿からの反射光を導いて原稿を読み取る公知のもので、前記走行体はスキャナ駆動モータ131によって副走査方向に駆動される。

【0031】画像形成装置110は前記CCDで読み取った画像データに基づいてレーザダイオード(LD)ユニット111によって変調されたレーザ光をポリゴンミラー113に導き、ポリゴンモータ112によって高速で回転駆動される前記ポリゴンミラー113からの反射光を帯電チャージャによって帯電した感光体114に照射して静電潜像を形成し、この潜像をトナーボトル115から供給されるトナーによって現像器116で現像し、転写部117で転写媒体(転写紙)に転写して定着部118で定着したあと排紙する公知の構造のものである。なお、符号119は転写される画像の濃度を検知するためのホトセンサ(Pセンサ)である。

【0032】給紙装置120はここでは2段の給紙部121と手差し給紙部122と、これらの給紙部121、122から用紙を取り出して縦搬送路125に沿って搬送する給紙コロ123および搬送コロ124と、搬送されてくる用紙と画像とのタイミングをとるためのレジストローラ126と、定着部118で定着を終えた用紙を排紙部129に排紙するための排紙コロ127と、一面に画像が形成された転写紙を両面機140に導く経路と前記排紙部に排紙する経路のいずれかを選択する分岐爪128とから主に構成されている。

【0033】両面機140は分岐爪128によって両面機側の反転経路141が選択された用紙を反転させる反転ローラ142と、この反転ローラ142によって反転させられた用紙を感光体側に再度導くための両面経路143に用紙を送り込む反転爪144と、転写部117に用紙を送り込む両面搬送ローラ145と、両面経路143に導かれた用紙を検出する両面搬送センサ146とを備えている。また、両面経路143は上端部が前記縦搬送路125の上端の分岐爪128によって導かれる開口部と一致し、下端部が前記縦搬送路125のレジストローラ126よりも上流側に設けられた開口部と一致するよう設定されている。

【0034】大略このように構成されたデジタル複写機100では、指定された給紙部121、122から用紙は給紙され、図示しないレジストセンサを経て、レジストローラ126によって感光体114に形成された画像の先端とタイミングを合わせるために一時停止する。一方、LDユニット111によって生成されたレーザ光はポリゴンミラー113により、画像の幅に広げられ、感光体114上に潜像を形成し、現像器116によって潜

像の部分にトナーを付着させることにより画像を形成し、転写部117へと送られる。レジストローラ126位置で一時停止させられた用紙は感光体114上の画像の先端が転写部117に到達するタイミングを計ってレジストローラ126部から搬送され、転写部117で用紙上に画像を転写し、定着部118を通過する際に熱と圧力により定着され、排紙部129に排紙される。

【0035】本実施形態で用いられるシステムは図8にも記載してあるように給紙部121、122から上方に配置されている排紙部129まで上向きに用紙を搬送する縦搬送システムである。そのため、定着部118を抜けた用紙を反転し、再び画像形成部110に送り込む両面機能の一つの手段として本体外に両面機構を持った両面機140を使用する。

【0036】具体的には図8に示すように、本体内の定着部118を抜けたところに位置する分岐爪128を制御することで定着部118以降の搬送路を変更し、両面機能を使用する場合は両面機140側に搬送されるように分岐爪128を傾ける。両面機140内に入った用紙は反転ローラ部142で搬送方向を逆転し、反転爪144の切り替えにより用紙を下方の方へと導く。さらに両面搬送センサ146を用いて両面搬送ローラ145部にて用紙を一時停止し、両面裏面の給紙開始信号により再び本体内に用紙を給紙し、レジストローラ126から転写部117へと送り込み裏面を印刷する両面機能を実現している。

【0037】なお、このような両面機140を使用している際に用紙ジャムが生じた場合、図9に示すように両面機140内の用紙は両面機140自体を開けて中から行う。また、本体内に残された用紙は一旦両面機140本体を開け、さらにその中にある本体ドア160を開けて取り除く。

【0038】ところで、この種の両面機140を使用した場合、ジャムが発生するたびに両面コピーをやり直しているのでは効率が悪い。そこで、このような両面機140を使用する場合、両面機140内で用紙を停止できる機構を備えているので、両面機140内まで搬送されてきた用紙は両面搬送ローラ145位置に停止させておく。そのため、ジャムによる印刷ジョブ停止後においても両面機140内の用紙情報、言い換えれば、両面搬送ローラ145部に用紙ありの情報をそのまま保持しておく。さらに、使用者によるジャム紙除去が行われるときには前述のごとく両面機140の開放が行われ、さらに本体ドア160の開放が行われて本体内の残留紙が除去され、先ほどとは逆の手順で本体ドア160を閉め、両面機140が閉められてジャムの解除となる。このとき、両面機140内の用紙情報をそのまま残しておくことにより両面機140内に残されたままの用紙は有効として扱い、再給紙後、両面機140内からの給紙を行う。これにより、ジャム解除後の再印刷動作の生産性を

上げることが可能となる。

【0039】このときの処理手順を図10のフローチャートに示す。この処理手順では、ジャムが発生すると(ステップ1001)、両面機140を開放し(ステップ1002)、ジャム紙を除去する(ステップ1003)。ジャム紙の除去が完了すると本体ドア160を閉め、さらに両面機140を閉めた後(ステップ1004)、両面機140からの給紙待ち、給紙が完了する(ステップ1005)と処理を終える。

【0040】両面機140を開けてまた閉めたときには両面機140内の用紙情報を保持しておくが、両面機140が開いている状態の時に使用者によって両面機140内の用紙が取り除かれる状態も考えられる。そこで、この状態を検出したときには両面機140内の用紙情報を無効とすることで確実に両面機140内の用紙情報を認識することが可能となる。この処理手順を図11のフローチャートに示す。

【0041】この処理では、ジャムが発生すると(ステップ1101)、両面機140を開放し(ステップ1102)、両面機140内の用紙が除去されたかどうかをチェックする(ステップ1103)。除去されていなければ、ジャム紙を除去し(ステップ1104)。ジャム紙の除去が完了すると本体ドア160を閉め、さらに両面機140を閉めた後(ステップ1105)、両面機140からの給紙待ち、給紙が完了すると(ステップ1106)処理を終える。一方、ステップ1103のチェックで両面機140内の用紙が除去されていれば、両面機140内の用紙情報をクリアして(ステップ1107)処理を終える。その際、すなわち両面機140が開いているときに両面機140内の用紙が抜かれたかどうかは、両面機140内の搬送に使用する搬送センサ146を用いる。こうすることにより、両面機140が開いているときの両面機140内の用紙有無の検出用に特別の構成を導入する必要がなくなる。

【0042】このように本実施形態に係る画像形成システムによれば、コピーアプリケーション311、プリンタアプリケーション312、FAXアプリケーション313などの拡張機能をシステム制御層300によって制御することによって同時に動作させることができるとばかりでなく、これらの機能を両面機140を使用して実行していくときに用紙ジャムが生じた場合、ジャム処理終了後に両面機140内に一面に画像形成された用紙が残っている場合には、その用紙を供給して他面に画像形成を行わせることができとなり、画像形成の生産性を向上させることができる。したがって、これらの処理はシステム制御層300内のシステムコントローラによって行われる。

#### 【0043】

【発明の効果】以上のように、請求項1記載の発明によれば、両面機内に1枚ないし複数枚の用紙を停止させる

手段と、両面機構内に用紙を停止させた状態で当該両面機を開閉したとき、両面機内の用紙を有効として制御を行う手段とを備えているので、両面通紙時に両面機に関わらないジャムが発生したときのジャム除去後の再印刷動作を行う場合の生産性を上げることができる。

【0044】請求項2記載の発明によれば、両面機を筐体に対して開放した状態において両面機内の用紙が取り除かれたことを検出した場合に両面機内の用紙を無効とするので、両面機からの用紙の供給を待たずに次工程に進むことが可能となり、これによって両面通紙時に両面機に関わらないジャムが発生したときのジャム除去後の再印刷動作を行う場合の生産性を上げると同時に、確実に両面機内の用紙情報を認識することができる。

【0045】請求項3記載の発明によれば、用紙が取り除かれたことの検出が用紙搬送に使用するセンサによって行われるので、特別な構成を付加することなく請求項2記載の発明の効果を得ることができる。

【0046】請求項4記載の発明によれば、両面機が画像形成装置本体の外面に着脱自在に取り付けられているので、画像形成装置本体外に両面機を有する機械における両面通紙時のジャム処理に伴う生産性の低下を防止ばかりでなく、再印刷動作を行う場合の生産性を向上させることができる。

【0047】請求項5および6記載の発明によれば、各種アプリケーションを連結することによってコピー機能、ファクシミリ機能、プリンタ機能などの拡張機能を実現する際の再印刷動作を行う場合の生産性を向上させることができる。

#### 【図面の簡単な説明】

30 【図1】本発明の一実施形態に係るデジタル複写機の外観を示す斜視図である。

【図2】図1のデジタル複写機の操作部を示す平面図である。

【図3】図1のデジタル複写機のシステムソフト構成を示すブロック図である。

【図4】図1のデジタル複写機のシステムハード構成を示すブロック図である。

【図5】図1のデジタル複写機におけるアプリケーション層とシステム制御層との関係を示す説明図である。

40 【図6】図1のデジタル複写機におけるコピーアプリケーションとプリンタアプリケーションのインターリープ動作を示す説明図である。

【図7】図1のデジタル複写機におけるFAXアプリケーションとプリンタアプリケーションの並列動作を示す説明図である。

【図8】図1のデジタル複写機の内部構成を示すモデル図である。

【図9】図1のデジタル複写機の両面機と本体ドアを開放した状態を示す図である。

50 【図10】本実施形態におけるジャム処理時の処理手順

を示すフローチャートである。

【図1】本実施形態におけるジャム処理時の他の処理手順を示すフローチャートである。

【符号の説明】

100 デジタル複写機

110 画像形成装置

120 紙装置

130 画像読み取り装置

140 両面機

150 原稿仕送り装置

160 本体ドア

\* 142 反転ローラ

144 反転爪

145 両面搬送ローラ

146 両面搬送センサ

300 システム制御層

301 システムコントローラ

310 アプリケーション層

311 コピーアプリケーション

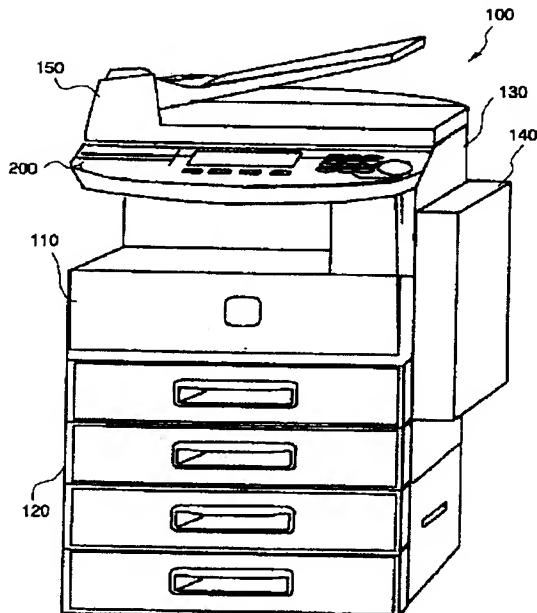
312 プリンタアプリケーション

10 313 FAXアプリケーション

\* 320 デバイス制御層

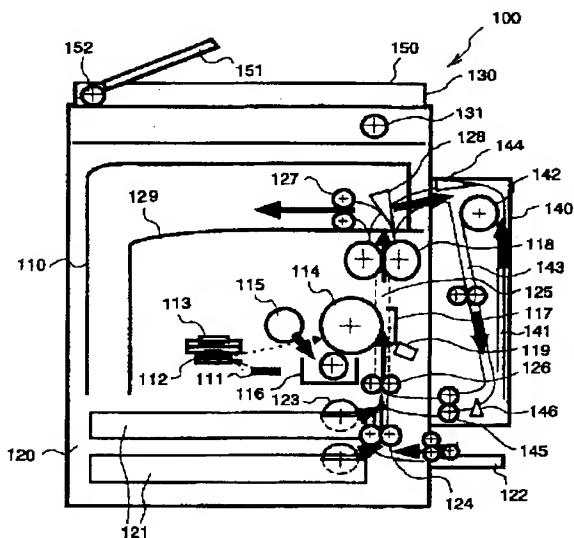
【図1】

【図1】



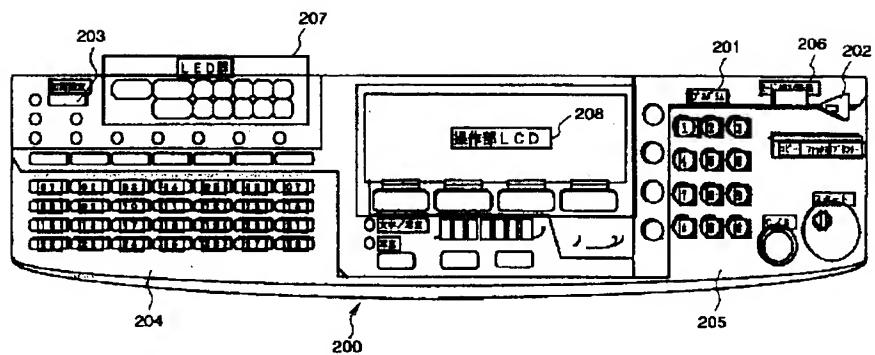
【図8】

【図8】



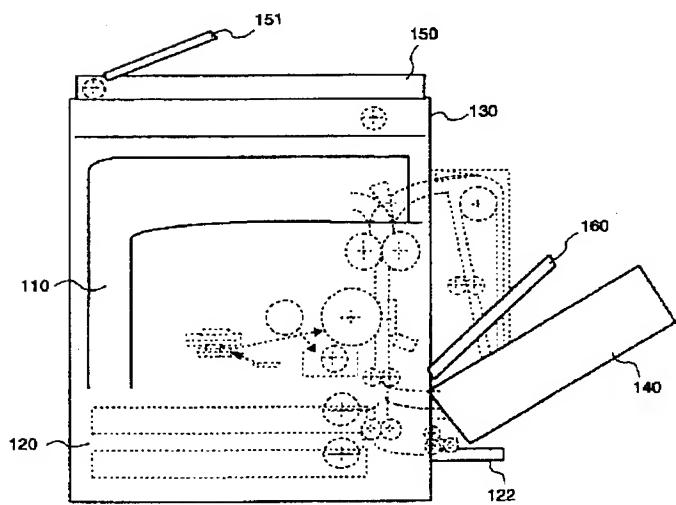
【図2】

【図2】



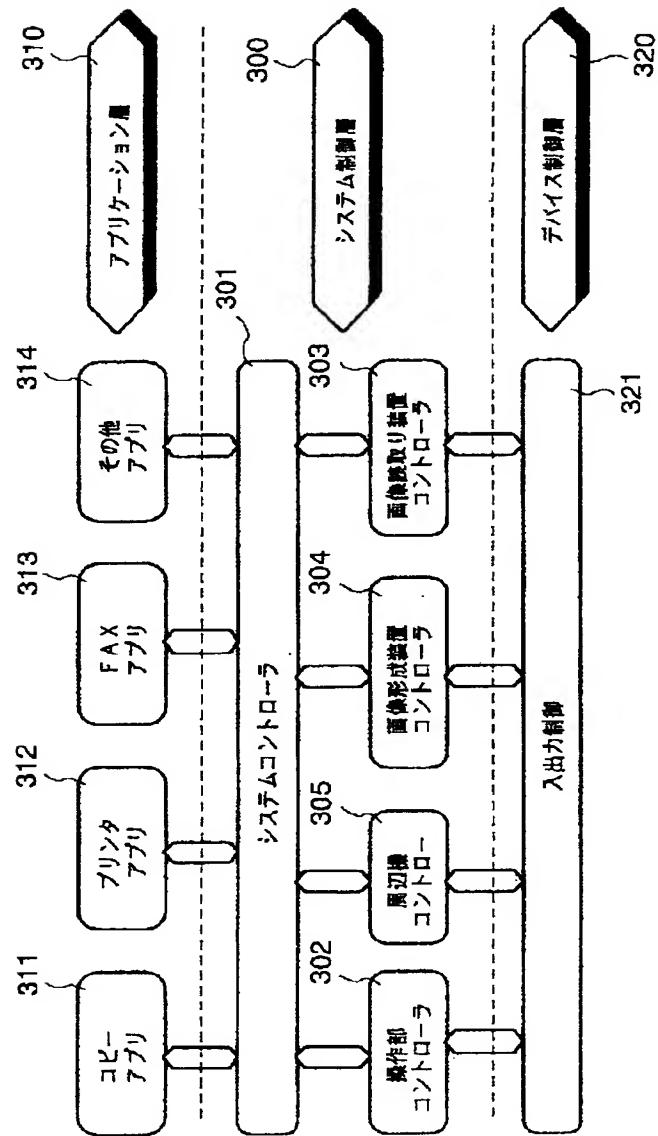
【図9】

【図9】



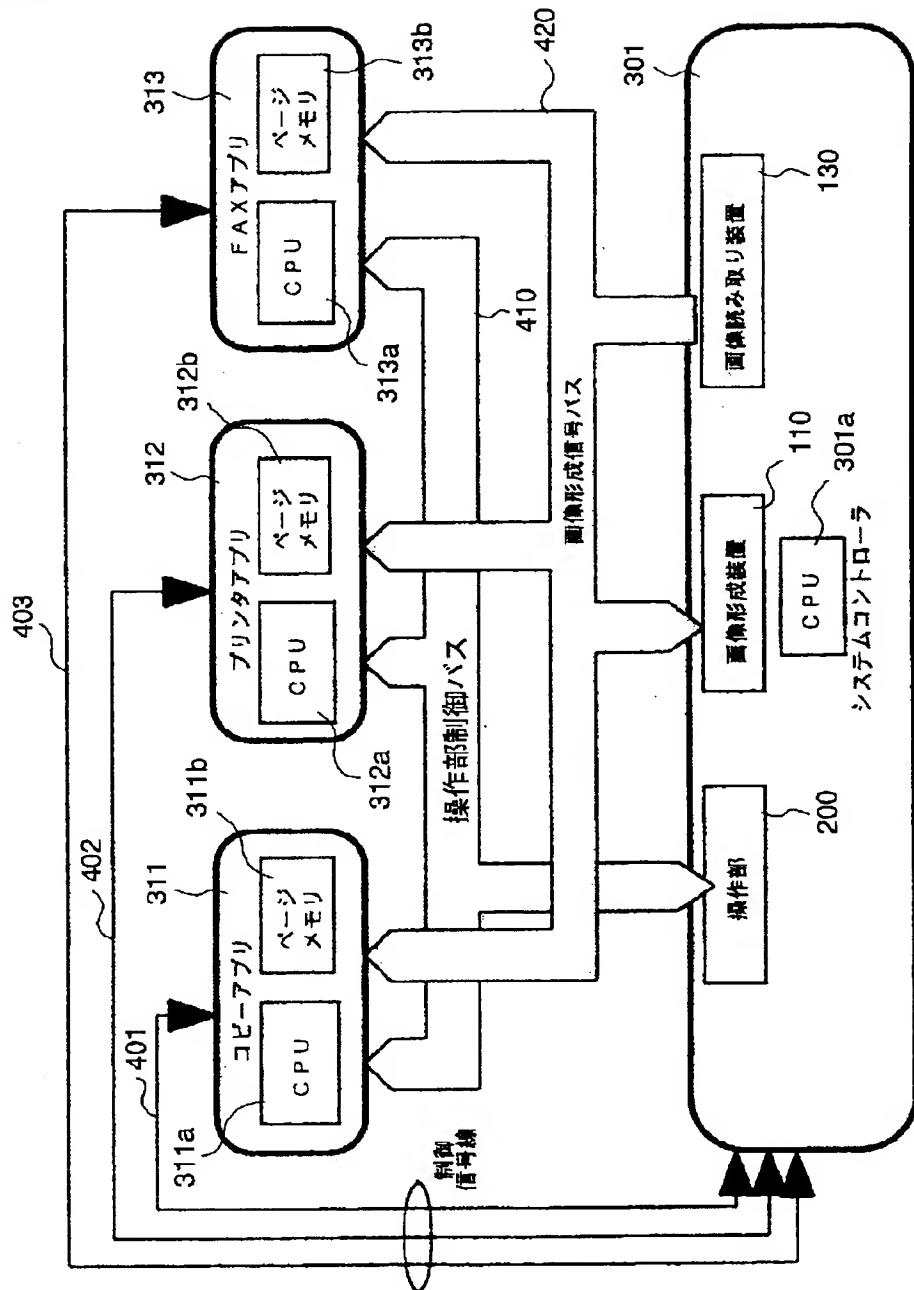
【図3】

【図3】



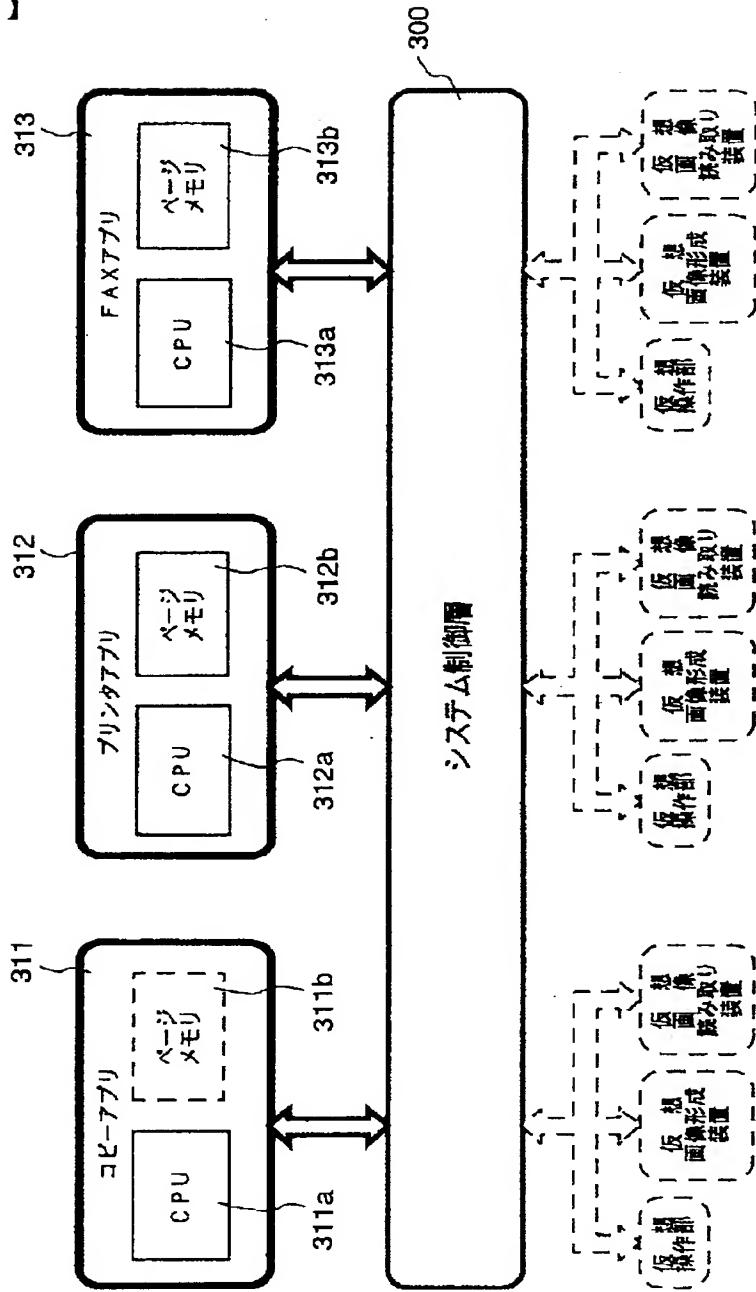
【図4】

【図4】



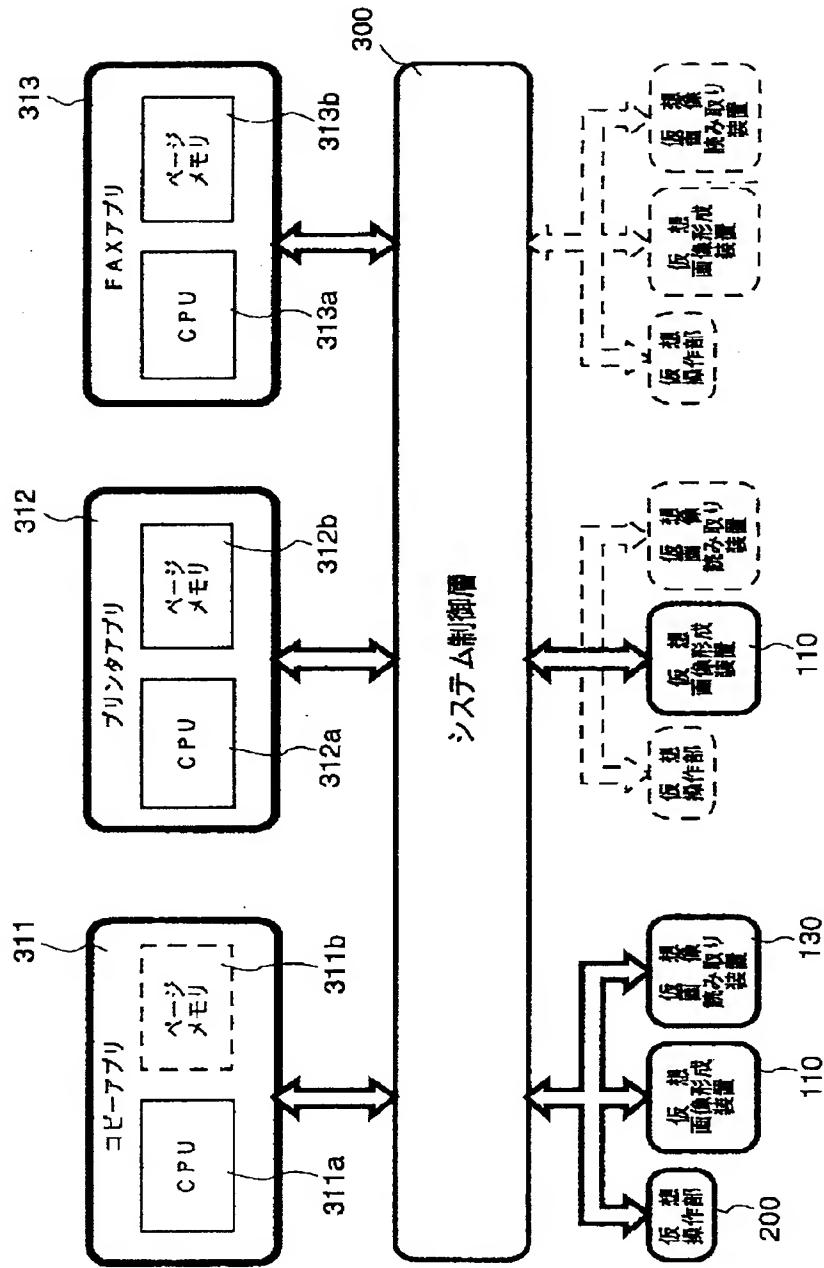
【図5】

【図5】



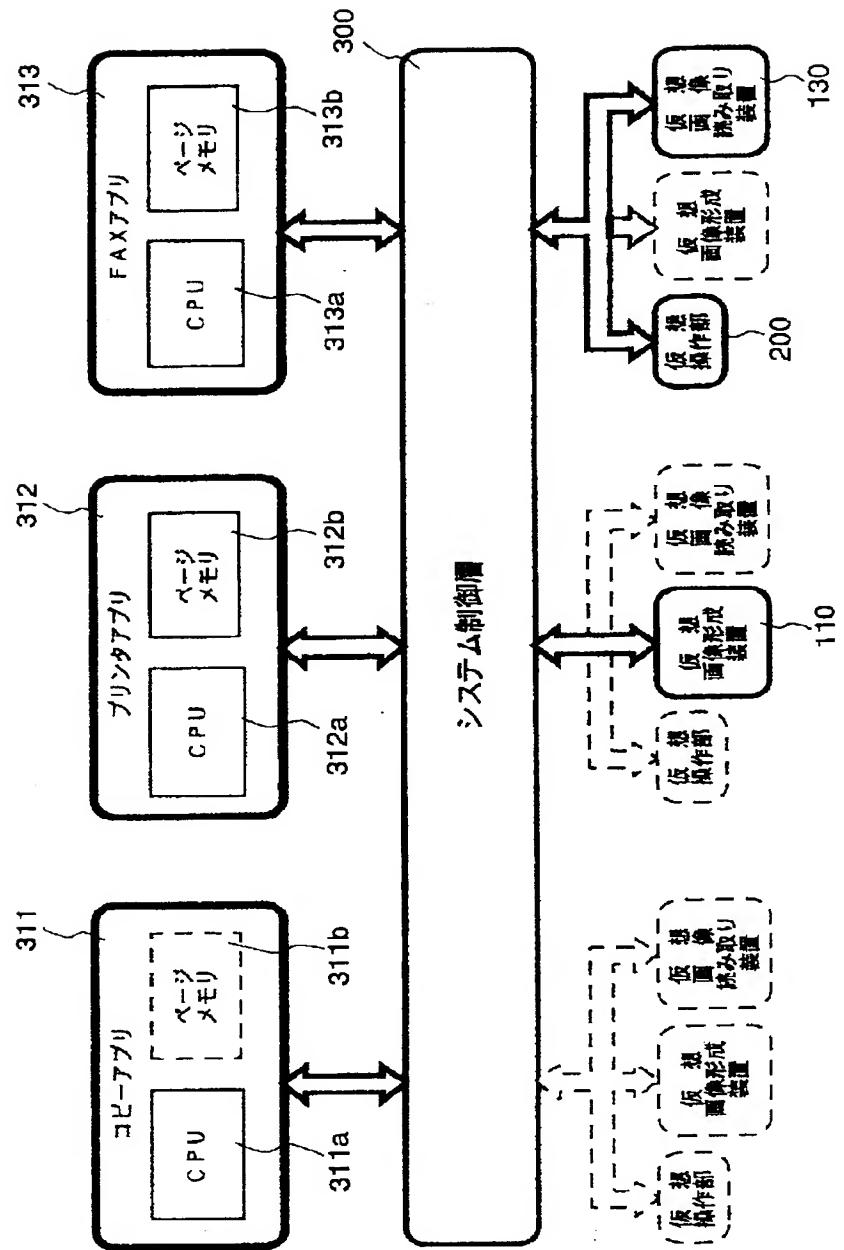
【図6】

〔图6〕



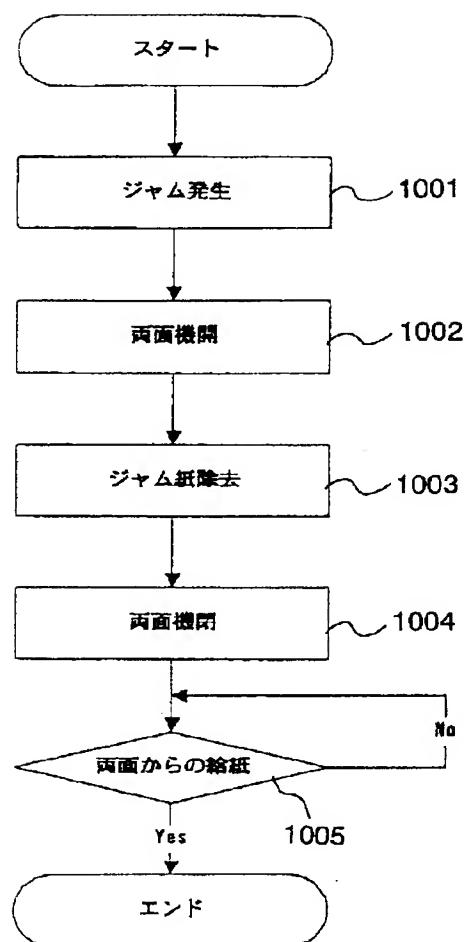
【図7】

【図7】



【図10】

【図10】



【図11】

【図11】

